

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY
MONDAY

FREE
INSIDE
A
GIFT
FOR
YOU

A
SUPERB
BOOKLET
THE
BOAC
VC10

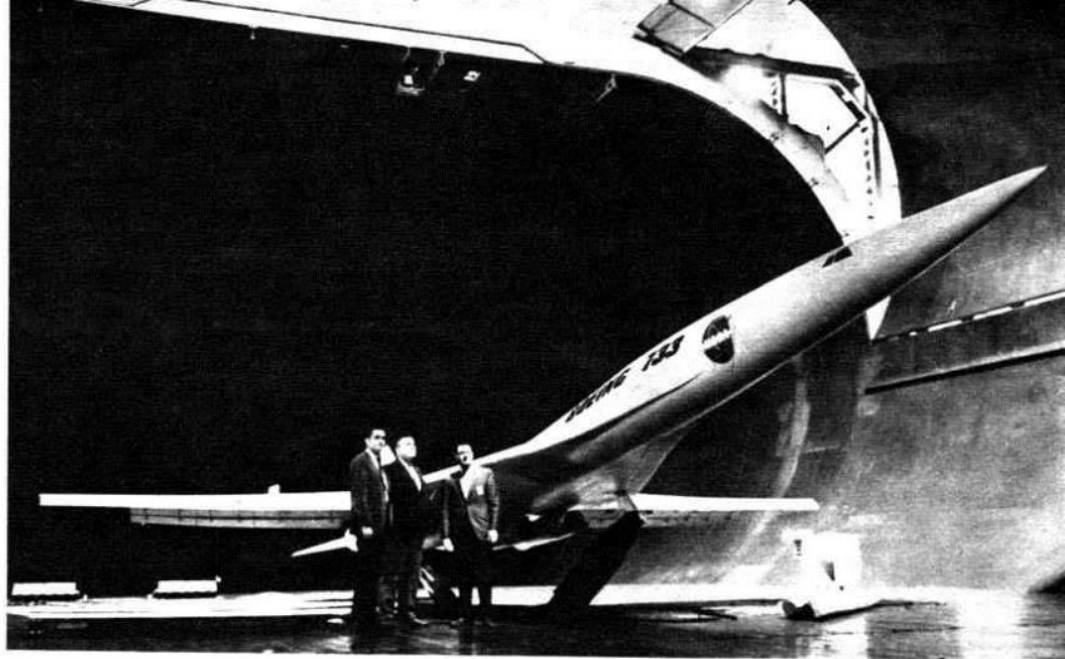
WONDER
AIRCRAFT
OF THE AGE



SEPT. 18 · 1965 1/-

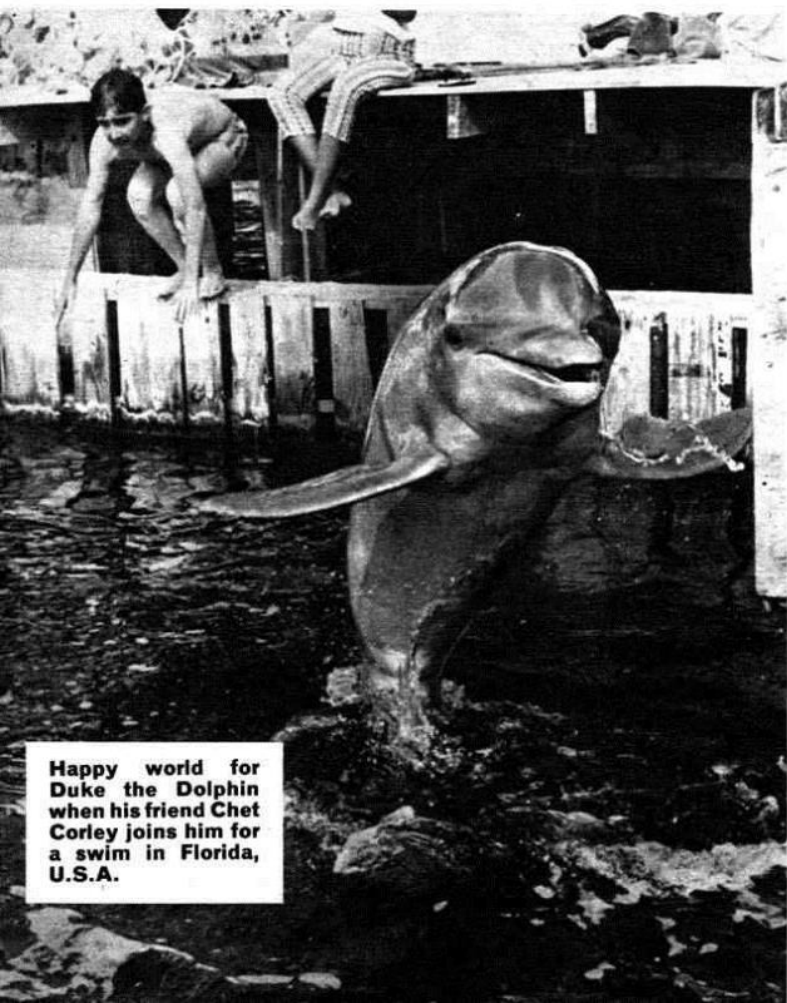
HAPPY- to meet you

SO you get up in the morning – take a bath – eat your eggs and bacon – and go to school. You come home, have tea, watch television or read and go to bed. And you think the world isn't very exciting, eh? Well, stop a moment and glance at these pictures and stories. Here is *your world today*. And what an exciting, laughable place it is. Isn't it good to be alive?



It's a windy world for this test model of a supersonic 'plane in the wind tunnel at Moffett Field, U.S.A. This will be the first passenger 'plane which folds its wings back to go faster, and this huge, fifth-size model weighs more than twice as much as a real single-seater sport 'plane.

YOUR world



Happy world for Duke the Dolphin when his friend Chet Corley joins him for a swim in Florida, U.S.A.



Dangerous world for this dare-devil stunt driver as he deliberately drives his car on two wheels. The car is a French Simca 1,000 and the picture was taken during a car rodeo at Monza Autodrome, Italy.



Topsy-turvy world for photographer-pilot James Gilbert who took this picture of himself.

You can Laugh— BUT IT'S TRUE!

● In a moment of thoughtless mischief, 18-year-old Grady Beck threw a rotten egg at a passing motorist. Unfortunately the driver of the car was off-duty policeman Carlos Rojas who chased and caught him. In court, the judge ordered Grady to wash the policeman's car every week for the rest of the year!

● At 11 a.m. at the New York World Fair this year, the Red Indian Chief of the Tuscarora Tribe, raised his arms to the sky and chanted, "Ta-rah-Yeh-Wa-Key" — in an appeal for it to rain. A few minutes later down it came — .02 inches of it. The Indian chief's name? — Black Cloud!

● San Francisco's beefy desk policemen found their chairs were too narrow for comfort and so wider ones have been provided at a cost of £1,600.

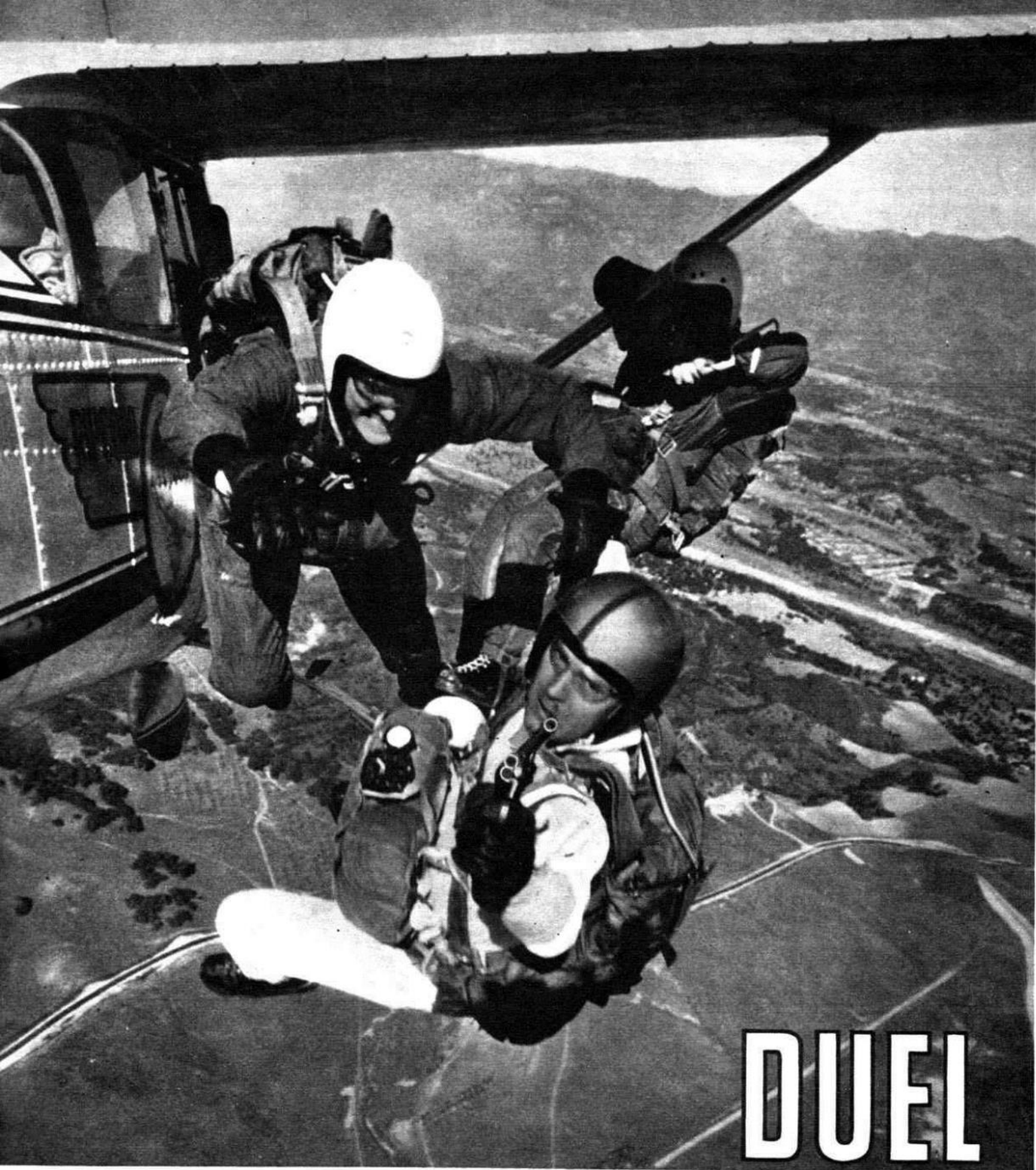
TODAY



It's up in the world for human cannon-ball Hugo Zacchini, as he is blasted 100 feet into the air for his circus act. Compressed air is used to blast him skywards.



And it's 'Out of this world' for the man who is wearing this experimental, Moon space suit.



DUEL IN THE SKY

ANOTHER death-defying stunt for the famous B.B.C. television series "Ripcord" has been planned.

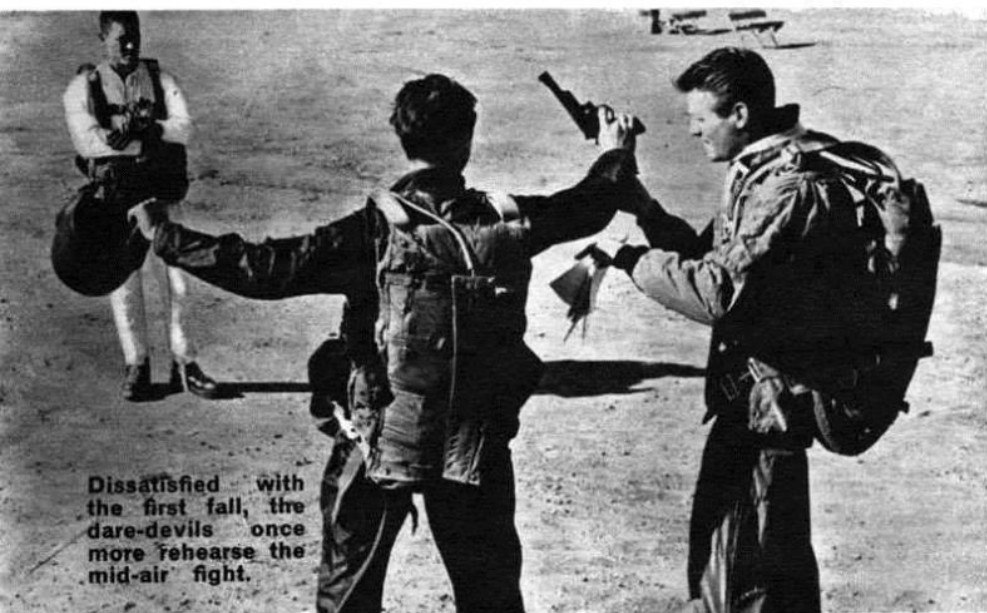
Two men are to make a "free fall" and fight a gun-duel as they plummet earthwards. A "free fall" is made from an aircraft before the parachute is opened. The parachutists guide themselves through the air by skilful use of arms and legs.

First the daring feat is rehearsed on the ground over and over again. Then the stuntmen board their aircraft and take off—and *action!* The actors trigger their guns, the cameraman operates his movie camera—and down, down, *DOWN* fall the three steel-nerved men.

A thousand feet they fall during the first twelve seconds, and then, as they



Pistols crash in the air as the ace cameraman records the duel.



Dissatisfied with the first fall, the dare-devils once more rehearse the mid-air fight.

reach their maximum falling speed of 120 m.p.h., the ground rushes towards them at the rate of 1,000 feet every 5.6 seconds!

As the actors battle in mid-air the camera records every action.

The three stuntmen land safely and breathe sighs of relief. "It's in the can. Let's call it a day," says the cameraman. But the actors are not satisfied with the "take". Again they rehearse the action on the ground and at last they are ready for another jump.

Once more the spine-chilling leap is made and this time everybody is satisfied. The three weary men set off for hot coffee. They have risked their lives so that we can sit by our quiet fire-sides and be thrilled by their amazing exploits.

The jump is made a second time. "Now for a hot coffee!"



INTO THE BLUE

A weekly series presented by NEVILLE DUKE the famous test pilot



VICKERS "VIMY"
96 M.P.H.



EMPIRE FLYING BOAT
130 M.P.H.



LOCKHEED CONSTELLATION
272 M.P.H.



BOEING STRATOCRUISER
315 M.P.H.



DOUGLAS DC7
320 M.P.H.



COMET 4
500 M.P.H.



BOEING 707
590 M.P.H.

VC 10

PRIDE OF BOAC

... And the planes
that blazed the
Atlantic sky trail

Forty-seven years ago two men named John Alcock and Arthur Brown made the first non-stop flight across the Atlantic Ocean. They flew in a Vickers "Vimy", a bomber of the first World War. Then nearly twenty years passed before it became possible for anybody to fly across the Atlantic easily and safely. Imperial Airways blazed the trail with their big flying boats which could, if need be, alight on the water.

Since then BOAC and Imperial Airways, who did the job

first, have had over twenty-five years' experience of the best way to carry passengers across this enormous ocean. On this page you can see some of the famous planes that have shortened to a matter of hours the trip that took Christopher Columbus nearly three months to complete.

Today BOAC planes take off to fly the Atlantic Ocean with all the regularity of trains leaving a big railway station. Chief among them are the super VC.10s, the "Crack Expresses" of this British airline. They can carry up to 150 passengers at over 600 miles an hour. Their take-off weight is over 140 tons, of which nearly half is the eighteen thousand gallons of fuel. This is enough to last the whole of their journey and leave plenty in hand if it is needed.



VC 10
600 M.P.H.

RANGER

LOOKING INTO THINGS — A weekly series

FOR hundreds of years people on Earth have stared at the Moon, that most romantic of all the other worlds. Poets and musicians have written songs about it and lovers have sighed for it. At sight of a new moon, superstitious people turn their money over in their pockets—for good luck.

But since time began, until 1964 one side only of the Moon had been seen. What was the other side like? Man's curiosity was aroused, and as always when this happens, man set out to satisfy his curiosity. That is why, during the past two years, the world has been regaled with exciting tales of rockets which have been carrying cameras thousands of miles to orbit the Moon and televise back to Earth the most amazing photographs ever taken.

The Americans called their "photo-the-Moon" project "Ranger," and nine Rangers have been built, each one a little different from the last as each Moon-shot taught the scientists something new.

The Ranger space craft is quite small. You can see it (1) on the left, packed tightly into its container on the nose of a rocket. Just over eight feet high, it weighs about 800 lbs.

The picture on the left, too, will give you some idea of what a Moon rocket is like. Very simply, it is an enormous tank for holding the fuel, and at the bottom of it are the rocket engines which produce the enormous thrust needed to lift the rocket by burning this fuel at the rate of tons a second.

Now let's see what happens when one of the nine Rangers is blasted off to the Moon.

First, the biggest part of its two-stage rocket, called

Atlas, has the tough job of lifting it off the surface of our Earth against the tremendous force of gravity. When this rocket's job is finished, Ranger is speeding along at 12,600 miles an hour.

That may seem fast—but it is not fast enough. Ranger needs another big push, so the empty rocket is dropped off and a second rocket, called Agena, is fired to give it a speed of 17,450 miles an hour. At this speed little Ranger hurtles round our Earth in a great circle, just like another Moon.

On goes Ranger, until it reaches a point in its circle from where it is sent speeding away on a new course towards the dark, unknown side of the real Moon.

Still Ranger is not going fast enough. So another part of the second rocket is fired—pushing its speed up to nearly 25,000 miles an hour—more than six miles a second!

When this happens the second rocket drops away and little Ranger is all on its own in space. As it gets nearer to its target, the Moon, which has a pull of gravity just like our Earth, begins to pull it in.

Nothing can stop it now from crashing into bits on the surface of the Moon. But before this happens Ranger has to do the job it was sent up to do.

It spreads its "wings" (2), which absorb energy from the sun's rays to drive the cameras and the television transmitter, and pushes out its antenna (3), and its cameras (situated at 4) begin to take photographs. Altogether, Ranger Nine took 5,814 photographs, which it sent back to Earth by television for excited people all over the world to study.

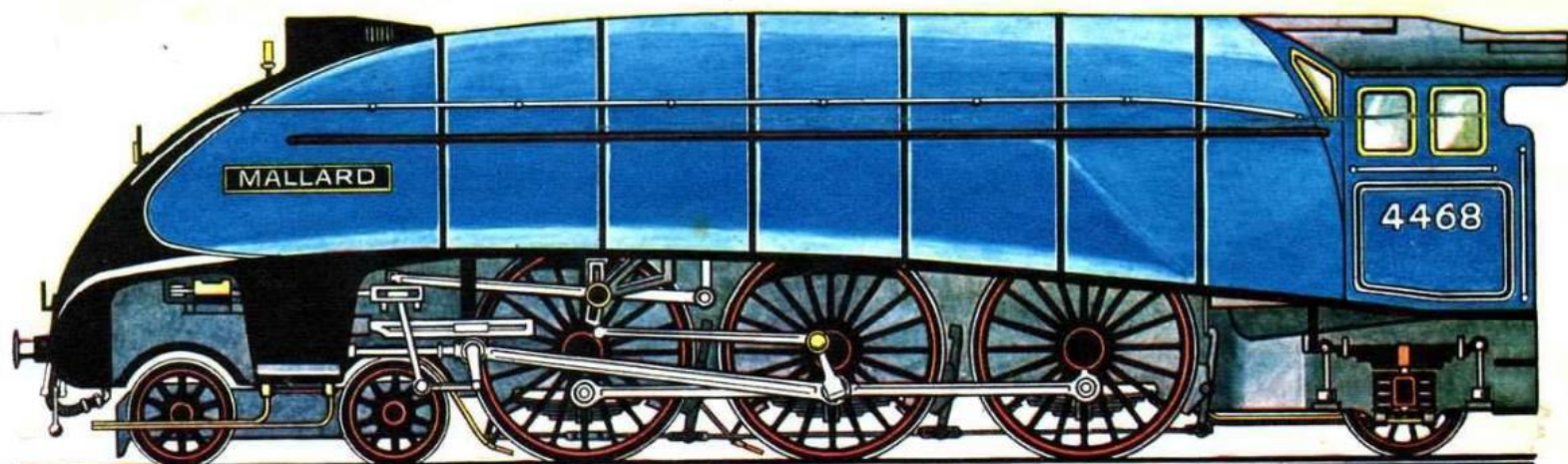


The smaller picture on this page shows Ranger over the Moon's surface taking its photographs. We know that the Moon's surface is like this because our artist copied it from a photograph. We still have a lot more to find out about the Moon, of course. But for what we know already, we can thank Ranger for a job well done. It has sent back information so that explorers who will one day go to the Moon will know what to expect.

In honour of this magnificent achievement, your new paper has been called **RANGER**

DAVID NIXON of T.V. fame is a great railway enthusiast. He writes for you each week

RAILWAY DAYS AND WAYS



AN ENGINE CALLED "MALLARD"

This was the fastest of all the steam engines. Built in 1935 by Sir Nigel Gresley for the old London North Eastern Railway, Mallard clocked 126 m.p.h., which is still the record for steam engines.

If you go to the railway museum at Clapham, you can see Mallard, and you will note that the wheels are now

covered in with flat plates at the side. Our artist has shown the engine with these plates, or valences, removed so that you can see the connecting rods. As a matter of fact, they were usually left off in Mallard's working days, since they proved to be a nuisance when it came to oiling and cleaning the mechanism.

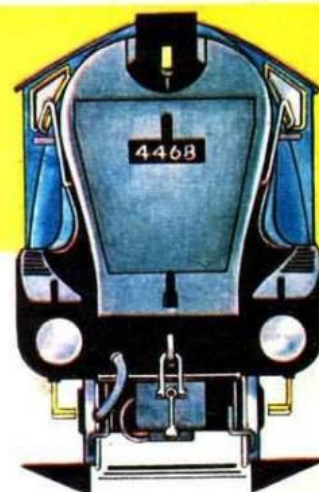
Mallard is a "Pacific" type loco. This was the name given to all engines which had four bogey wheels in the front, six big driving wheels, and two trailing bogey, or "pony truck" wheels at the back.

BY A HAIR'S BREADTH

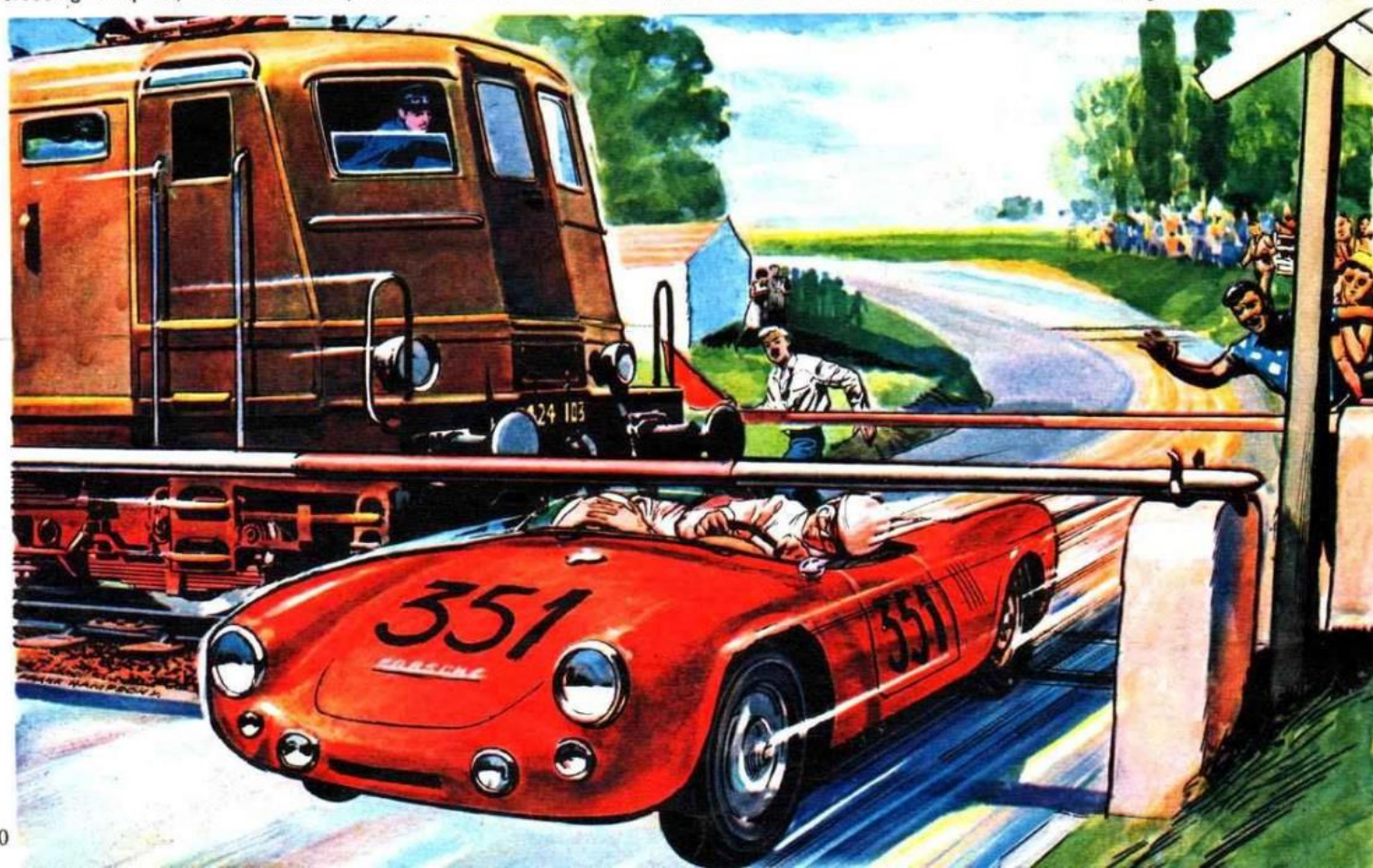
In this country we have gates at level crossings, and when a train is due, these gates are always closed. On the Continent the level crossing gates are often more like poles, and drop down from above, instead of swinging across.

Imagine then, how the driver of a crack diesel express on the Berlin line felt, when, as he approached a level crossing at speed, he saw a red sports car hurtling

towards the gates, (which were already dropping) without slackening speed. The car, driven by Max Schmidt, was taking part in a road race, and Schmidt was clearly taking a chance on getting across. The train driver put his brakes on hard and, fortunately, Schmidt did not reduce speed at all. The low-slung sports car shot under the level crossing poles with inches to spare between it and the oncoming express!



Mallard weighed 103 tons. Her boiler pressure was 250 pounds per square inch. She had three cylinders, two on the outside and one hidden away between the frames.



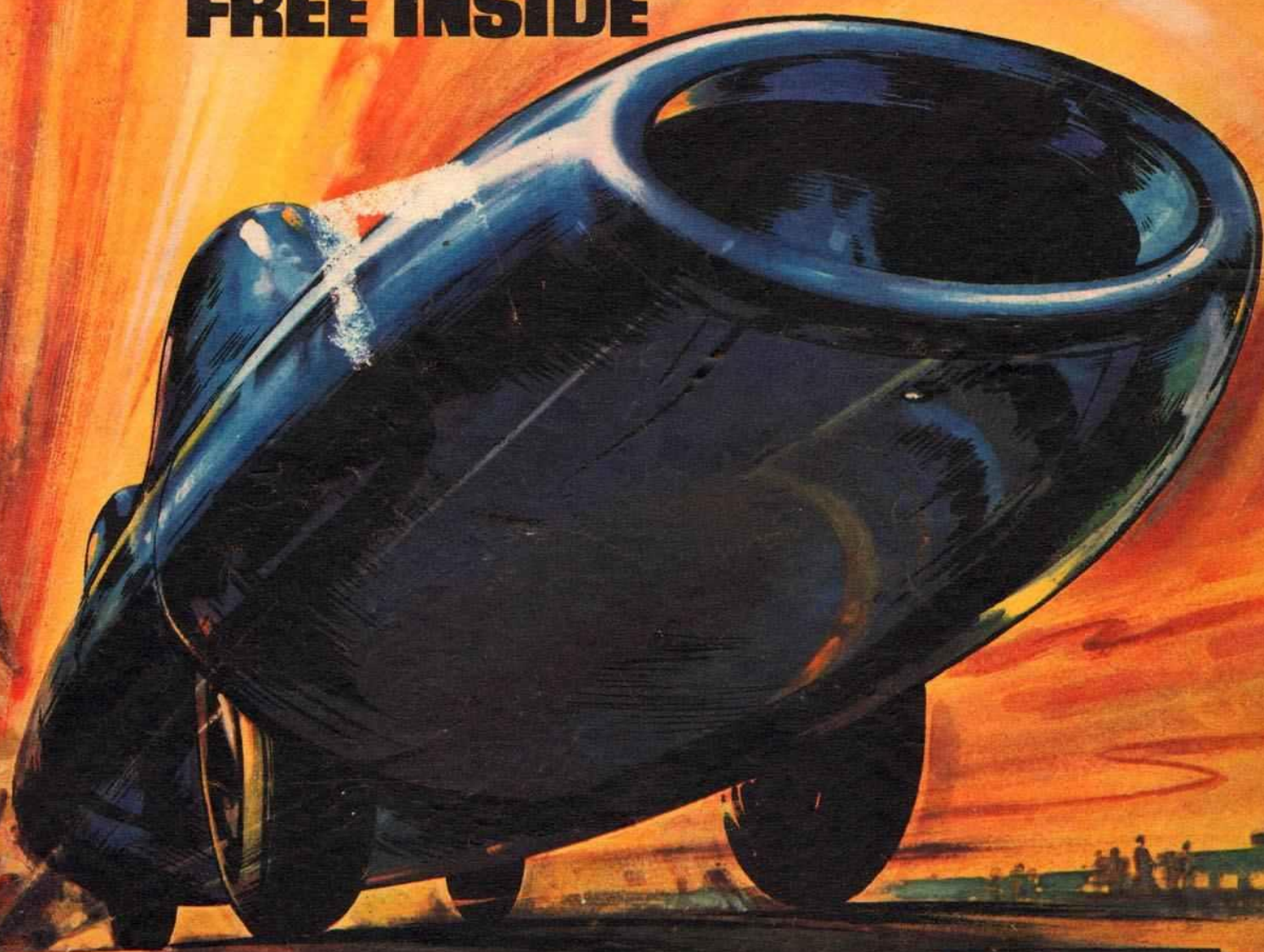
GIFT INSIDE ▶

RANGER

THE NATIONAL BOYS' MAGAZINE

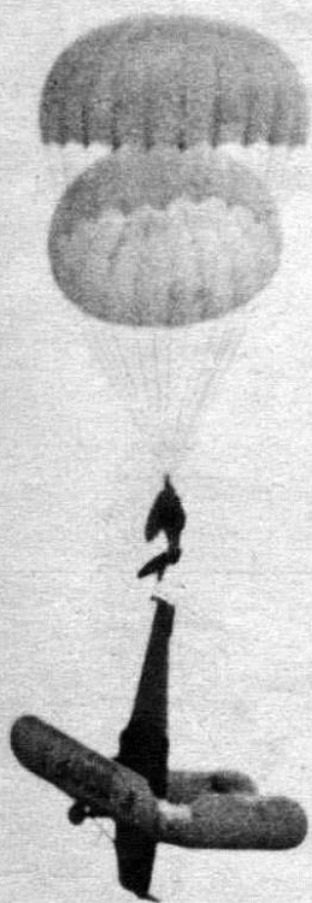
EVERY MONDAY

**Donald Campbell smashes
the world land speed record
in Bluebird—and his
ALBUM of RECORD BREAKERS is
FREE INSIDE**



SEPT. 25 · 1965 1¢

HANGING, smiting, strolling, diving—what a wacky whirl of world events! Look at the pictures on these two pages and you will agree that the oddest things are happening all over *your* world TODAY!



YOUR

HANGING aeroplane and pilot are saved from crash by parachutist! That is exactly what happened when a French parachutist-instructor, ex-Adjutant Chionni, prevented this biplane from crashing in France.

"I was going to jump in the normal way," he said, "when for some reason my parachute cords became caught up in the tail of the aircraft.

"The plane fell slowly . . . I opened the second parachute and halted its fall. That's how we floated down to earth together. I had only one fear—that the tail of the biplane would break free of my parachute, and crash to earth with my pilot."



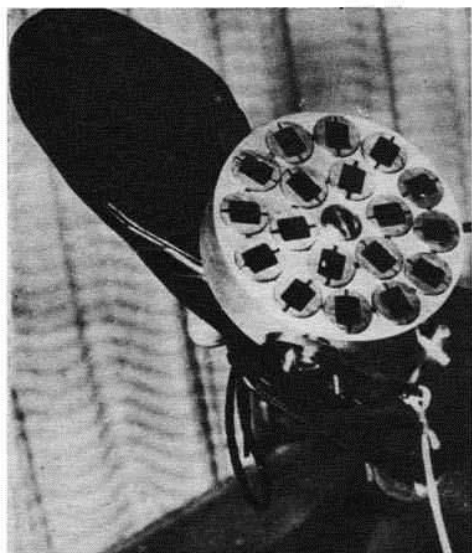
world



SMITING . . . but missing . . . is this New York priest during a city baseball session held as part of a campaign to take New York's children off the streets.

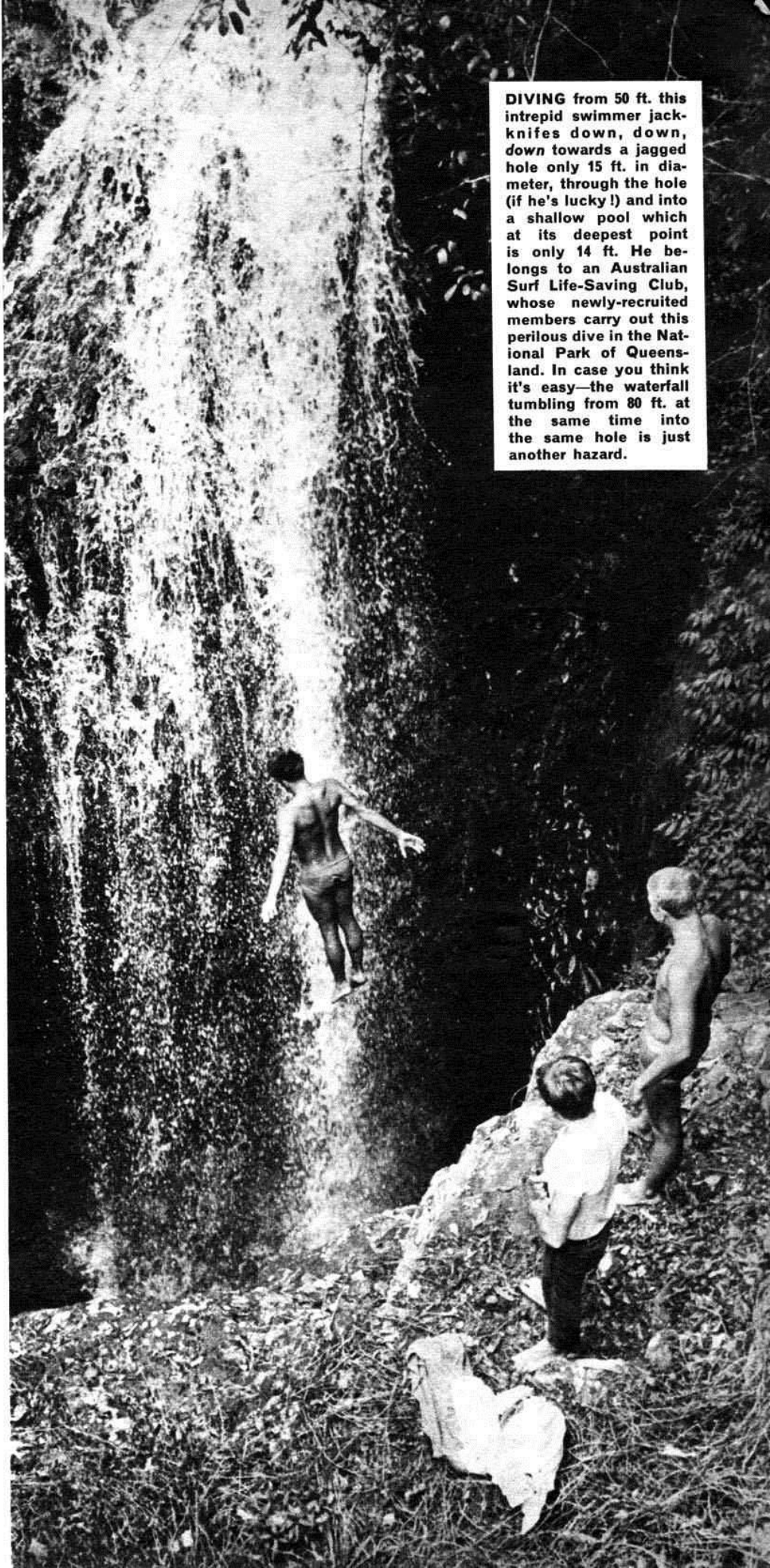


TODAY



STROLLING like a fly on the ceiling is Frenchman Jean Sanchon. The secret is in the magnetic boots he wears. Attached to each boot are eighteen small but powerful magnets (above). At each step he pulls a cord which detaches one foot from the girder. What use are they? Well, one firm's workers use them to clean the inside of giant petrol tanks.

DIVING from 50 ft. this intrepid swimmer jack-knives down, down, down towards a jagged hole only 15 ft. in diameter, through the hole (if he's lucky!) and into a shallow pool which at its deepest point is only 14 ft. He belongs to an Australian Surf Life-Saving Club, whose newly-recruited members carry out this perilous dive in the National Park of Queensland. In case you think it's easy—the waterfall tumbling from 80 ft. at the same time into the same hole is just another hazard.



LOOKING INTO THINGS

THE SPITFIRE

This is the Supermarine Spitfire, the now legendary fighter plane that throughout the Second World War kept Britain's enemies at bay. Altogether more than 20,000 Spitfires were built, and at the outbreak of war they played an outstanding part in the Battle of Britain. Against today's planes they would look tiny with their standard wing span of 36 ft. 10 inches. On pages 14 and 15 you can read about Paddy Finucane, one of the greatest young air aces of the war who flew in Spitfires and shot down 32 enemy planes.



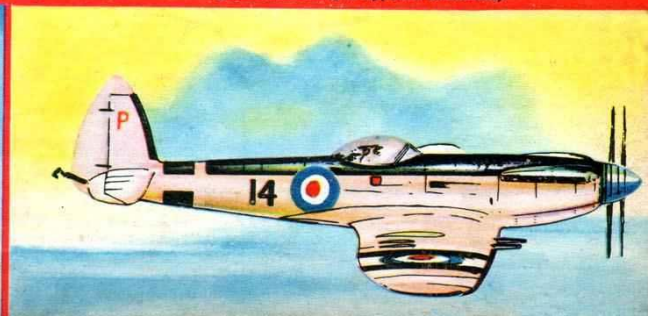
Spitfires first flew in 1937. With the Hurricane fighter plane they equipped almost all the home defence squadrons in 1939.

The Spitfire was modified in many ways. This is one of the Griffon engine Spitfires with contra-rotating propellers (two propellers on a single shaft rotating in opposite directions).

The high altitude Spitfire with wing tips extended to give greater lift.

The "clippy" Spitfire with wing tips cut short to give it extra speed. But at the same time this reduced its ability to manoeuvre and limited its use.

Spitfires used for taking photographs on reconnaissance were painted blue. They were unarmed and depended upon extra speed to escape from enemy planes.



READ THESE PAGES AND MAKE UP YOUR MIND. DO YOU WANT TO GO TO THE MOON?

LIFE ON THE MOON



IN four years time, if not before, the United States hopes to put the first men on the moon.

A whole new world will then be ready for discovery—just as two thousand years ago our world was ready to be discovered by daring explorers.

The famous Ranger satellite, which we showed you in action in the first issue of **RANGER**, has already been to the moon to take photographs and televise them back to Earth.

It was in honour of that historic achievement that your new magazine was named **RANGER**.

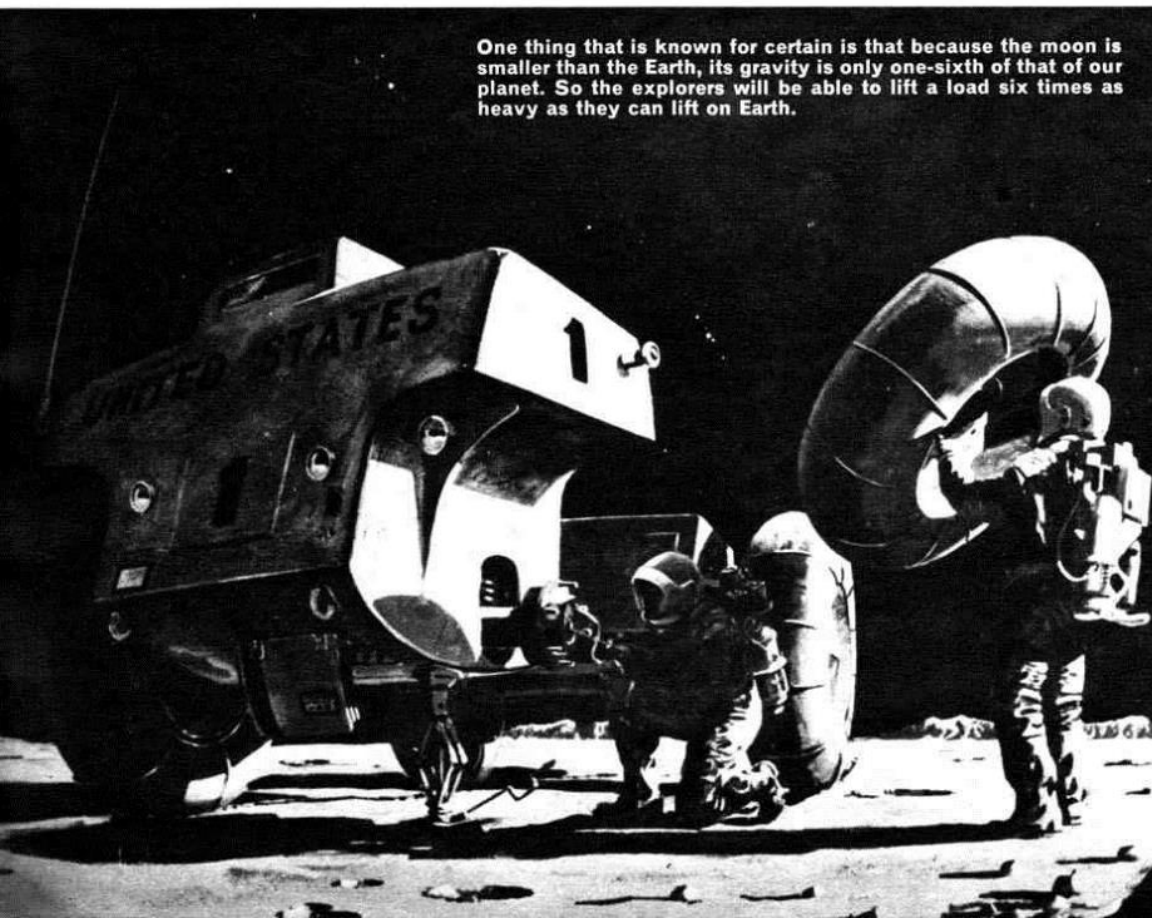
Now that scientists have seen the Ranger satellite's pictures, what do they think the moon's surface will be like?

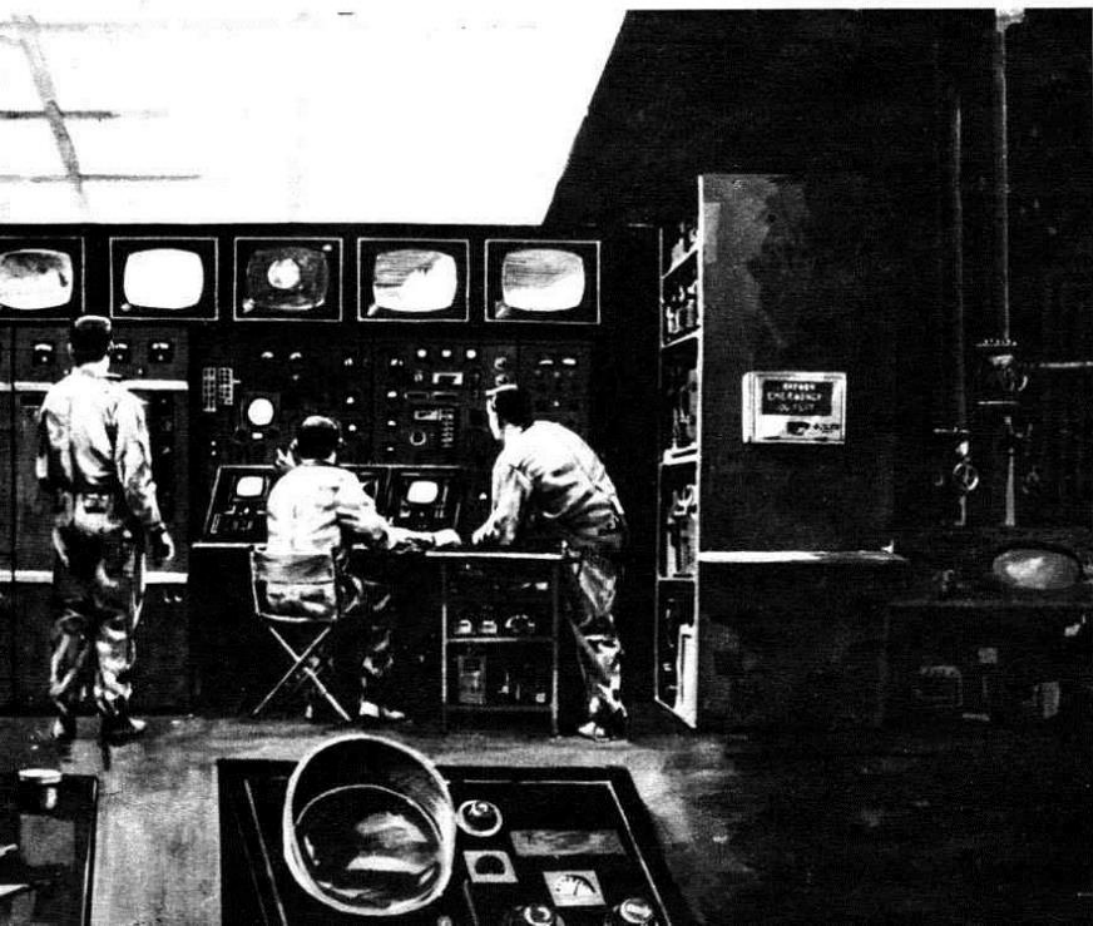
Some say that it may be made of dust, but with a vast sheet of ice underneath. It remains to be seen, therefore, whether or not it can bear the weight of a spacecraft.

No one knows for certain yet how the first men in the moon will be equipped. But what those early explorers will see and what they will be doing on their arrival may be something like the pictures on these two pages.

Come with us, then, on a trip with the first men in the moon.

One thing that is known for certain is that because the moon is smaller than the Earth, its gravity is only one-sixth of that of our planet. So the explorers will be able to lift a load six times as heavy as they can lift on Earth.





▲ This rocky wall—80 miles long and 800 ft. high—has been seen on the moon. The only way to scale it may be with the aid of one-man rocket belts that will shoot the explorers to the top. Such belts have already been built and it is believed that they could propel men 1,000 ft. high on Earth—and higher on the moon because of the lower gravity there.

Observation stations like this one will have to be built, but construction workers must overcome tremendous problems. They will face surface temperatures of 212 degrees Fahrenheit by day, and minus 270 degrees Fahrenheit at night. When they are facing the sun the front of their bodies may be 200 degrees warmer than their backs. And because there is no atmosphere to carry sound they will not be able to hear warning of landslides. So unless they can SEE an avalanche coming they will be in danger.

WELL HOW ABOUT IT? DO YOU WANT TO GO TO THE MOON?

FREE INSIDE More Coloured Pictures for your **RECORD BREAKERS ALBUM**

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

OCT·2·1965 1^{/-}

New C.S.FORESTER Story
OF WORLD WAR II
GOLD FROM CRETE
INSIDE



Polishing the track with the seat of his pants is side-car rider J. R. Bent. He and his partner R. F. G. Powell had a lucky escape when their machine crashed during a race at Brands Hatch, in Kent.

YOUR world TODAY



THE odd things, the exciting things, the amusing things . . . hundreds of them happen in the world every day. So wonder a little, laugh a little and learn a little as you take a good look round Your World Today!

Hey! There's a man in orbit! Hurtling 200 feet above London's busy streets is acrobat Frank Paulo. The photographer caught him somersaulting as he bounced on a trampoline on top of a G.P.O. building. He was rehearsing for a circus performance.

"Hey! Mind my head!" A photographer with a sense of humour took this trick picture of two men working in a manhole. He asked one of them to stand astride the hole and put his hands under the chin of his mate as he popped his head out.



You can laugh— BUT IT'S TRUE!

● When a man in Harlow, Essex, arrived at his new home in the New Town, he had to spend his first night sleeping on the floor. His bed was too big to get up the stairs and he was refused permission to remove an upstairs window. He eventually solved his problem by sawing his bed in half and then putting it together again, but now he has a permanent dip in the middle of it!

● Nineteen-year-old Charlie McNally decided to walk from London to his home in Glasgow. To make it easier he sent his luggage by rail. Charlie did the journey in six days, but his luggage didn't arrive until one-and-a-half days later!

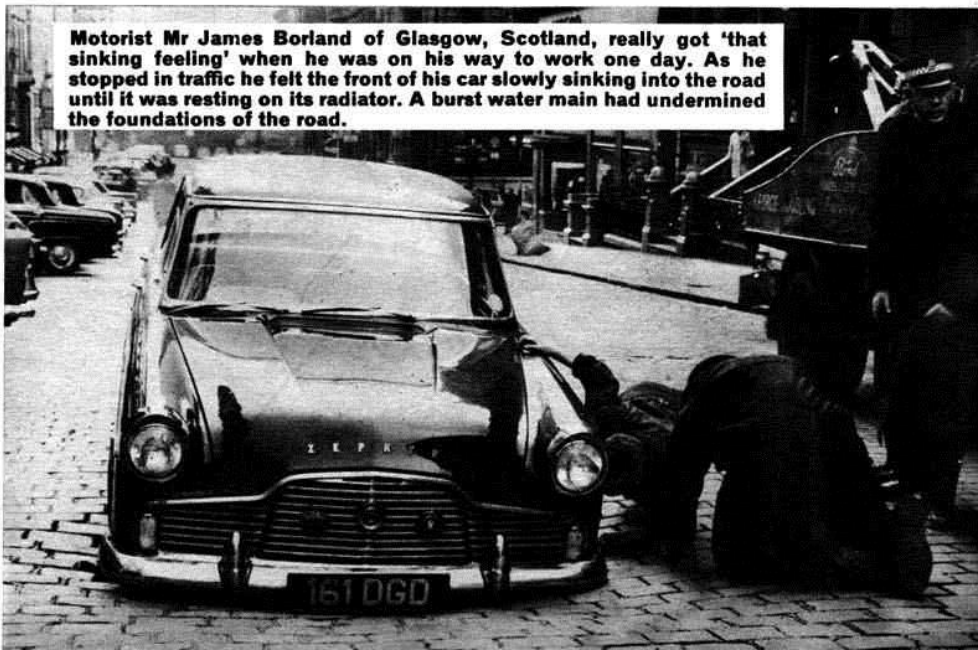
● Obeying the Government's request to hand in all types of firearms has cost one family in Stafford their front doorstep. Reason? It was made out of a shell brought back from the First World War.



If you went shooting with this old flintlock gun you would need a couple of assistants to help you hold it. It weighs more than 100 lb. and is 9 ft. long. Known as a rampart gun, it comes from India and was made about 1770, probably for a Prince or Rajah. It once belonged to Clive of India, but is now the property of a London dealer.



Motorist Mr James Borland of Glasgow, Scotland, really got 'that sinking feeling' when he was on his way to work one day. As he stopped in traffic he felt the front of his car slowly sinking into the road until it was resting on its radiator. A burst water main had undermined the foundations of the road.



ONE of the problems that aircraft designers have to face in our age of speed is that the bigger and faster they build their aeroplanes, the longer the runways have to be for them to take off.

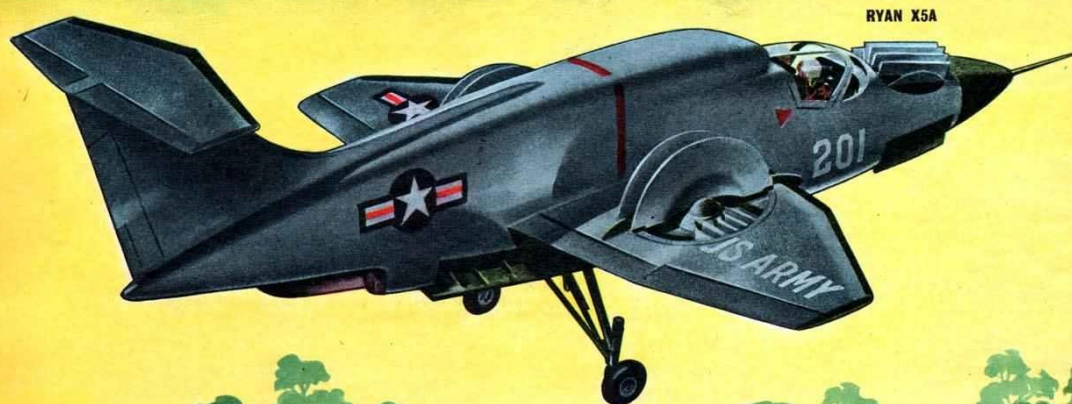
Then they began to wonder if, instead of hurtling along a runway for take-off, aircraft could fly straight up in the air. Thus the runway part of an airport would no longer be needed.

Designers set to work on the idea and discovered that aeroplanes *could* be made to take off vertically. The big pictures on these pages show two of the most successful planes that have been built.

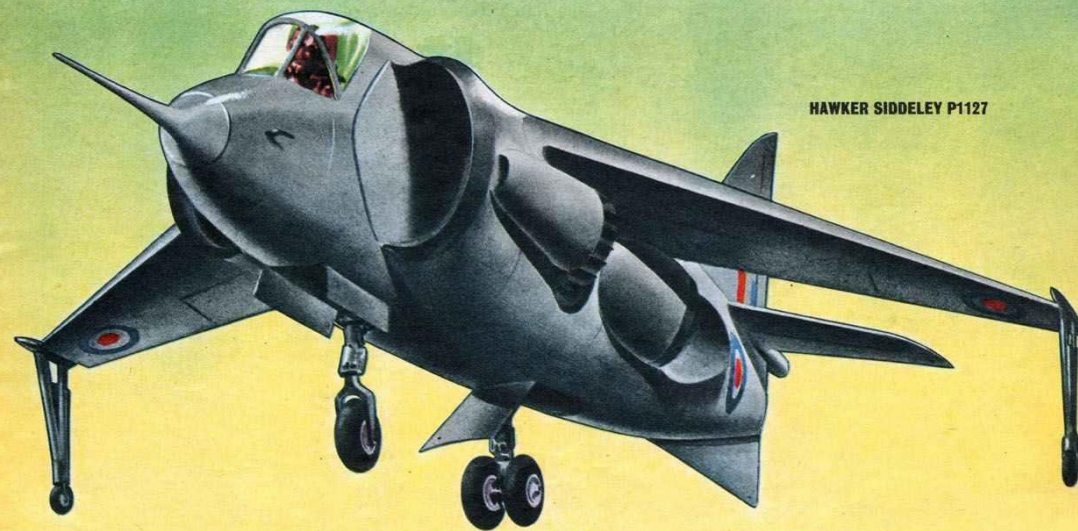
Below is the Ryan X5A, and on the right is the Hawker Siddeley P1127. Both aeroplanes work in different ways.

The Ryan is pushed off the ground by three powerful fans—one in the nose and the other two in the wings. These fans are made to spin at high speed, thus creating a downward draught which lifts the plane.

When the aircraft is airborne and ready to go forward, flaps cover the fans (you can see the flaps sticking up in the picture) and it is then very much like any other small jet aircraft.



RYAN X5A



HAWKER SIDDELEY P1127

The P1127 has one big jet engine in the fuselage which pushes its jet stream out through four rear-facing openings, two of which you can see on the side of the fuselage, just under the wing.

In these four openings are deflector vanes which can send the jet stream screaming out backwards, or downwards, so that the aircraft can be lifted off the ground, or driven forward as needed.

Along the bottom of these two pages you can see some of the other methods designers have used to get their aircraft off the ground quickly.

And as well as these, airliners are being designed which have two separate sets of jet engines—one set facing straight down for take-off and landing, and the other set placed in the normal position to drive the plane through the air.

RYAN X5A

Here you can see how jets of air are directed differently either for take-off and landing, or for forward flight.



A FOUR-FAN TRANSPORT OF THE FUTURE

This big Bell aircraft from America has propellers mounted in 'barrels'. These are positioned here as for take-off and landing—they turn to face forward in normal flight.



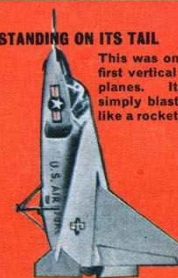
THE HILLER/RYAN XC142

This machine looks like an ordinary aeroplane—until it tilts its wings upwards, and takes off like a lift!



STANDING ON ITS TAIL

This was one of the first vertical take-off planes. Its jets simply blasted it off like a rocket.



HOW HELICOPTERS GO UP

Helicopters are machines with one big 'fan' over the top. It is important to stop the whole machine turning round the opposite way to the 'fan'. That is why most of them have a small propeller facing sideways at the rear, or, as with this one, a jet of air that does the same job.



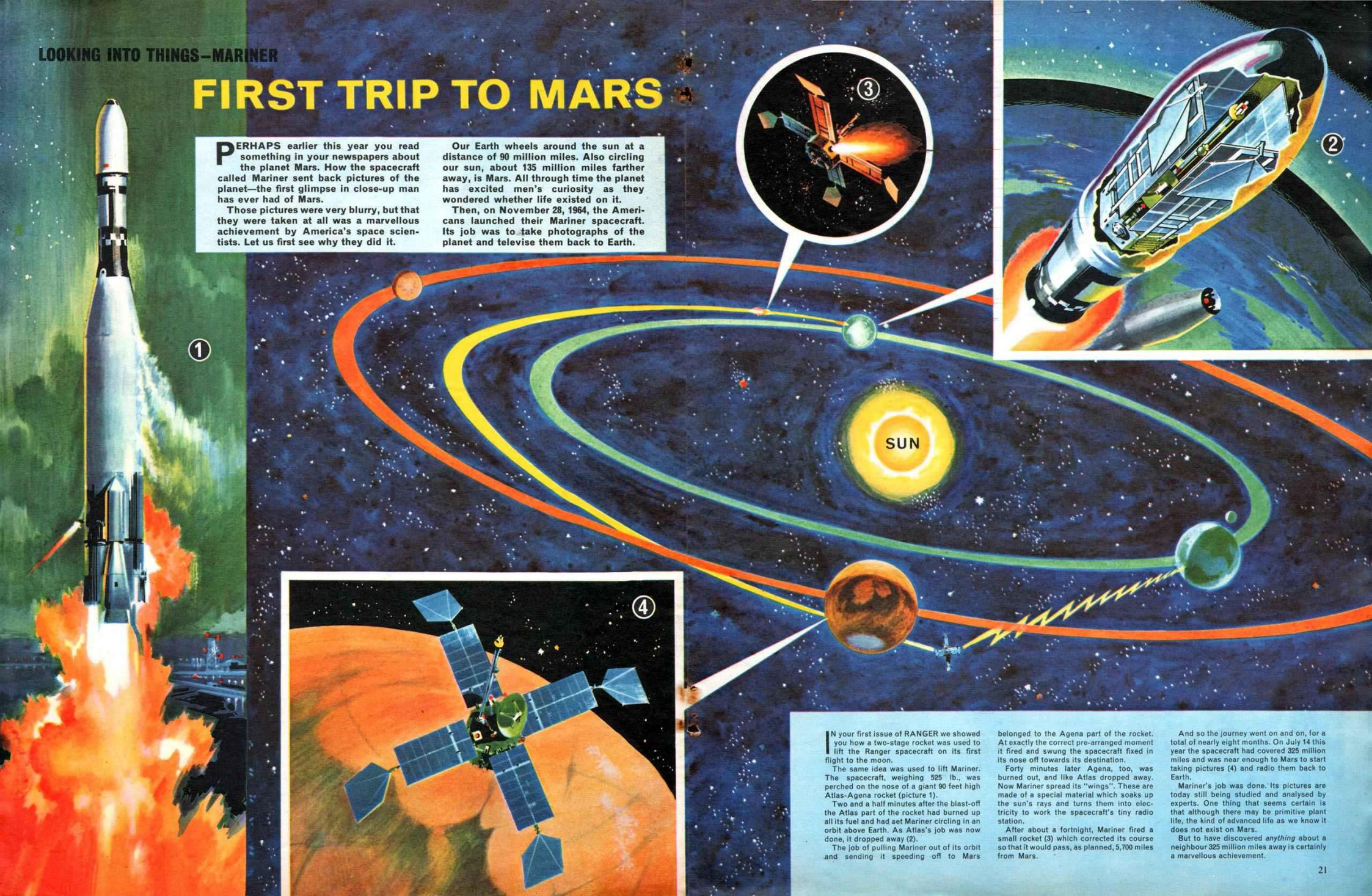
FIRST TRIP TO MARS

PERHAPS earlier this year you read something in your newspapers about the planet Mars. How the spacecraft called Mariner sent back pictures of the planet—the first glimpse in close-up man has ever had of Mars.

Those pictures were very blurry, but that they were taken at all was a marvellous achievement by America's space scientists. Let us first see why they did it.

Our Earth wheels around the sun at a distance of 90 million miles. Also circling our sun, about 135 million miles farther away, is Mars. All through time the planet has excited men's curiosity as they wondered whether life existed on it.

Then, on November 28, 1964, the Americans launched their Mariner spacecraft. Its job was to take photographs of the planet and televise them back to Earth.



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IN your first issue of RANGER we showed you how a two-stage rocket was used to lift the Ranger spacecraft on its first flight to the moon. The same idea was used to lift Mariner. The spacecraft, weighing 525 lb., was perched on the nose of a giant 90 feet high Atlas-Agena rocket (picture 1). Two and a half minutes after the blast-off the Atlas part of the rocket had burned up all its fuel and had set Mariner circling in an orbit above Earth. As Atlas's job was now done, it dropped away (2). The job of pulling Mariner out of its orbit and sending it speeding off to Mars

belonged to the Agena part of the rocket. At exactly the correct pre-arranged moment it fired and swung the spacecraft fixed in its nose off towards its destination. Forty minutes later Agena, too, was burned out, and like Atlas dropped away. Now Mariner spread its "wings". These are made of a special material which soaks up the sun's rays and turns them into electricity to work the spacecraft's tiny radio station. After about a fortnight, Mariner fired a small rocket (3) which corrected its course so that it would pass, as planned, 5,700 miles from Mars.

And so the journey went on and on, for a total of nearly eight months. On July 14 this year the spacecraft had covered 325 million miles and was near enough to Mars to start taking pictures (4) and radio them back to Earth. Mariner's job was done. Its pictures are today still being studied and analysed by experts. One thing that seems certain is that although there may be primitive plant life, the kind of advanced life as we know it does not exist on Mars. But to have discovered *anything* about a neighbour 325 million miles away is certainly a marvellous achievement.

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RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY



CANOPY RELEASE

DANGER
EJECTION
SEAT
DANGER



OCT. 9. 1965 1/-

YOUR World TODAY

Do you know . . . ? You've often heard those words. But it's the people who do things that make you gasp who make your world such an interesting place to live in today . . .



Do you know . . . that the Prince of Wales is a RANGER? Well, it's true because when this photo was taken, he was taking part in a polo match at Windsor and playing for that well-known polo team, the Rangers. .

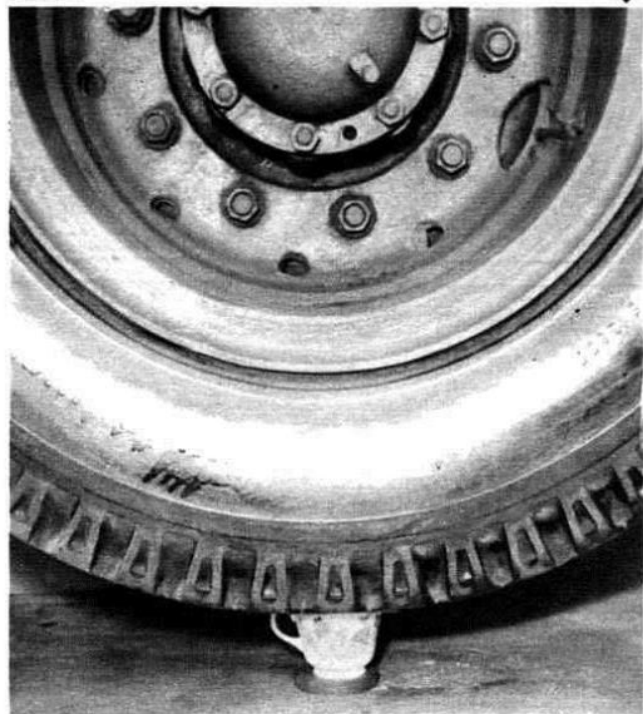


Do you know . . . ? First World War pilot Major Christopher Draper caused a lunch-time sensation in London in 1953 when he flew under 15 bridges spanning the River Thames in a three-seater Auster plane. Afterwards he said: "I did it to prove that I am not too old at 61 to do a good job." He had not been in regular work for 14 months.



Do you know . . . ? Ten-year-old Philip Ohlson of California determined to start a race track that was different. So Philip, who had noticed how speedily the little sandcrabs squirm their way through the soupy sand by the water's edge, caught three sandcrabs, sat them on his arm and waited for action. But the crabs refused to move. After experimenting on dry land Philip learned that a sandcrab out of sand is as helpless as a fish out of water. Sadly, he returned them to the beach where they scuttled away happily.

Do you know . . . ? A bus weighs six and a half tons and a Wedgewood teacup weighs about an ounce, but, said pottery experts, six teacups could hold up one bus. To prove it they raised the bus on hydraulic jacks and then slowly lowered it on to the six cups. The experts were right—the cups did not break!



YOU CAN LAUGH —BUT IT'S TRUE!

● It isn't hard to imagine how millionaires make their money when one hears of such cases as Mr. Norman Eagles and Mr. Spencer Mosely, both American millionaires. Mr. Eagles washes his own socks in order to save himself £25 a year in laundry bills, and Mr. Mosely cuts his son's hair every fortnight to save the cost of a haircut.

● When police in Oklahoma City, U.S.A., spotted a motorist driving along with a horse in the back of his open car they stopped him and asked for an explanation. He told them he thought the horse looked so lonely in its great big field that he just had to take it for a ride! He was arrested for horse stealing.

● Nineteen-year-old Charlie McNally walked from London to his home in Glasgow in six days. He sent his luggage by rail—but it did not arrive until one-and-a-half days later!

● People leaving a church meeting in Parsons, Kansas, were horrified to see two men beating Mrs. Toby Newkirk over the head with tennis rackets. Several men rushed to stop them, only to be told they were doing it at her request . . . to get rid of a swarm of bees in her hair.

What happens

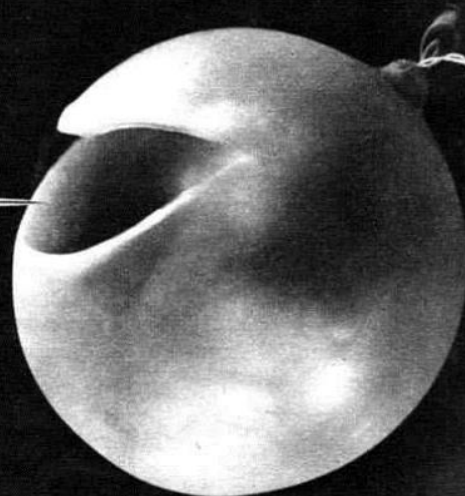


when

a dart



hits



a balloon



full of

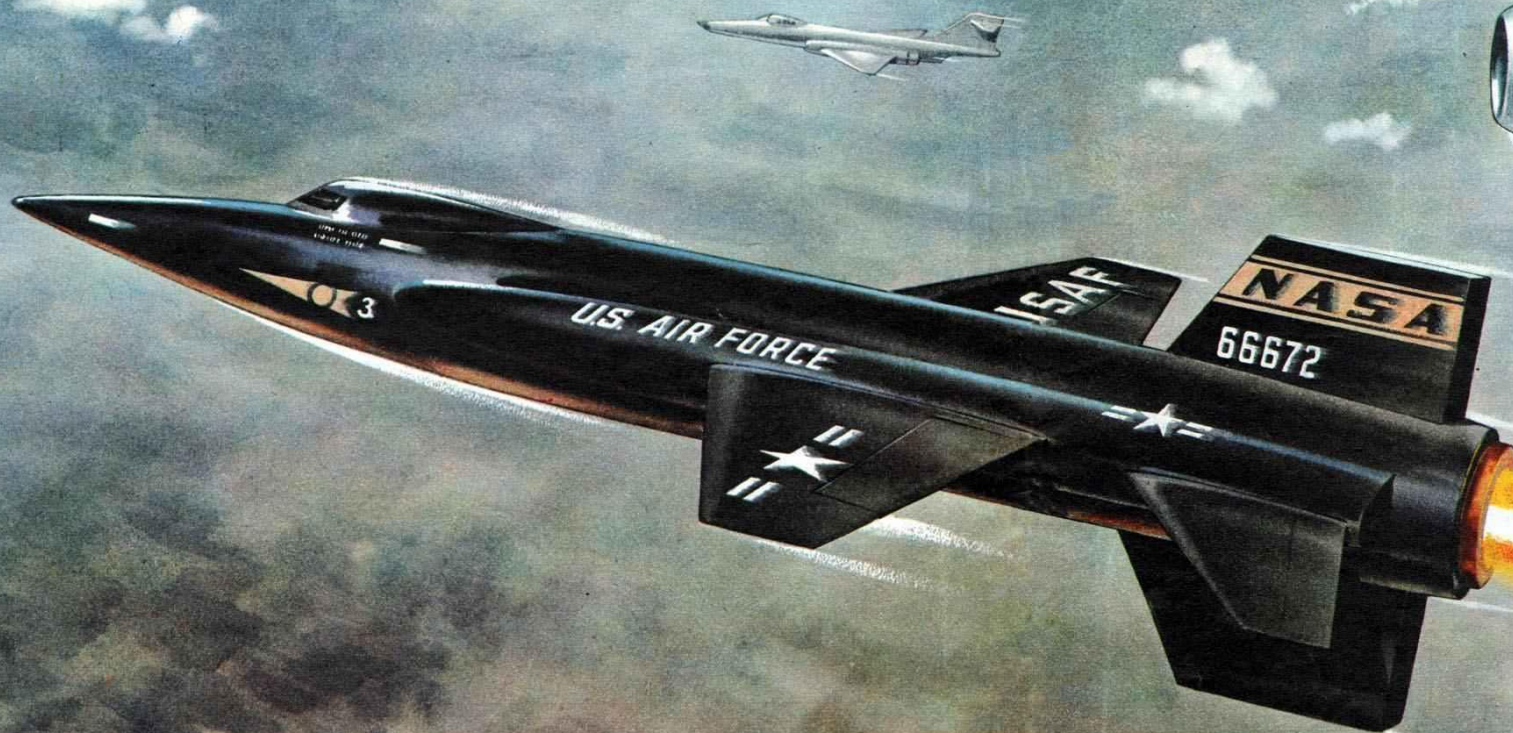


SMOKE!



INTO THE BLUE

X15—THE 4,000 M.P.H. PLANE



The X-15 speeds away from its 'mother' aircraft, a giant B-52 bomber, which has already carried it nearly nine miles above the earth. You can see part of the wing and four of the bomber's eight jet engines (above). The small aircraft beyond the rocket plane is a fast jet-fighter escort to help the pilot of the X-15 in case he has to make an emergency landing.

FORTY-FIVE thousand feet above the mountains of Nevada, in America, a huge B-52 jet bomber speeds through the thin upper atmosphere at over 600 m.p.h. Tucked under its starboard wing is a tiny needle-shaped aircraft—the X-15 rocket plane, a high-speed, high-altitude, research machine.

Inside its cramped cockpit the test pilot watches his control panel. As all his warning lights flash green he has a last word with the captain of the giant bomber—it's all systems 'Go!'—and the X-15 drops away.

The liquid-fuelled rocket engine bursts into life and half a million horse-power thrusts the plane into space at over 4,000 m.p.h. Within 80 seconds its 8 tons of fuel is exhausted, but the plane continues to climb until it is nearly 67 miles above the earth.

Now begins the test pilot's most difficult task—bringing the X-15 safely down in a long, engineless glide. He dare not enter the atmosphere at too steep an

angle or the plane will overheat and burn up like a meteorite.

At 50,000 feet the leading edges of the plane glow red-hot with the friction. At 18,000 feet the pilot cuts the speed to a mere 350 m.p.h. and starts to spiral over the landing ground. Great skill is called for in the final minutes of the flight, for if the pilot has failed to line his machine up accurately with the runway he cannot switch on his engine and try again.

At 10,000 feet he is on the final glide-path and lowers the landing skids and nosewheel. As he touches down on the runway his speed is 200 m.p.h. A huge parachute opens out behind him to cut his speed down further, but the aircraft travels another three-quarters of a mile before coming to a stop.

It is a little over eleven minutes since the pilot began his flight and in that time he has travelled almost 400 miles in a great soaring arc which took him to the edge of space.

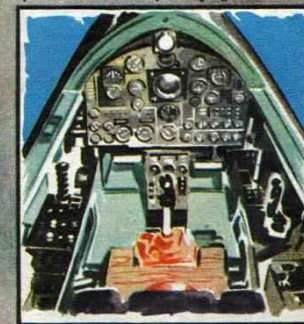
The X-1 (below) was the first of a number of rocket planes built for high-speed research. It flew at 700 m.p.h. in 1947.



A later design was the X-3, known as the Flying Silhouette. This first flew in 1952 and had turbo-jets instead of a rocket engine.

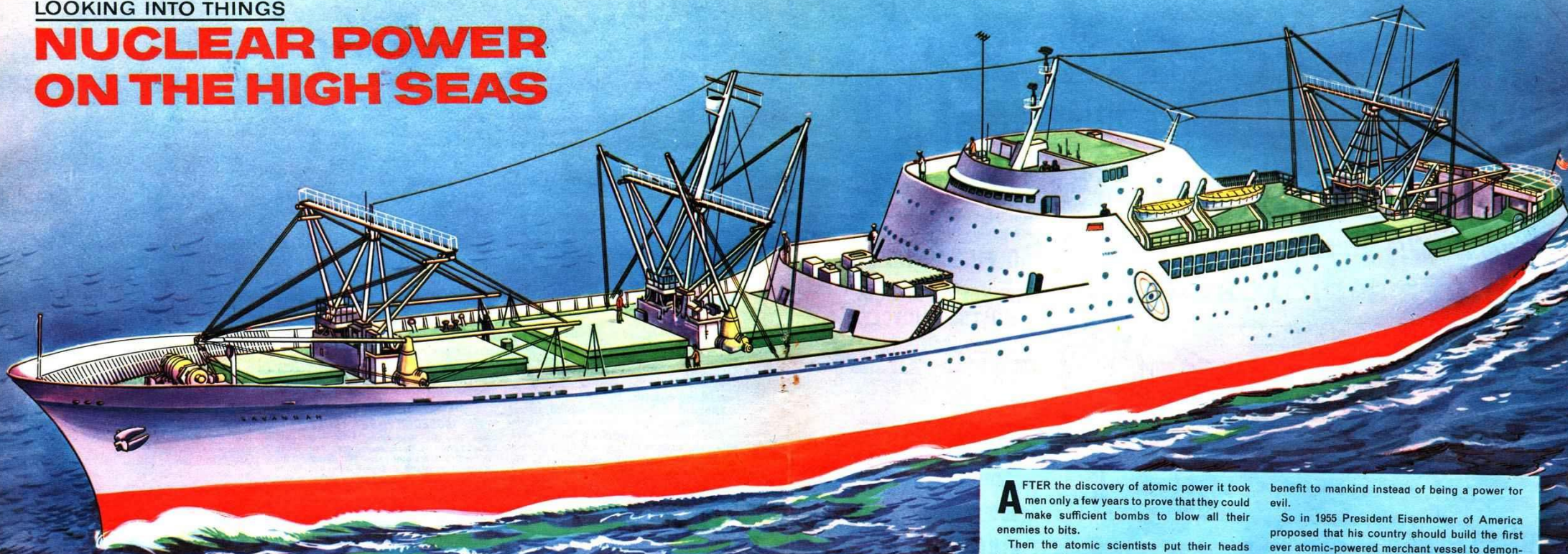


The cockpit of the X-15 has three control sticks—one for normal speeds, one for supersonic speeds and one for space flying.



BARBER

NUCLEAR POWER ON THE HIGH SEAS

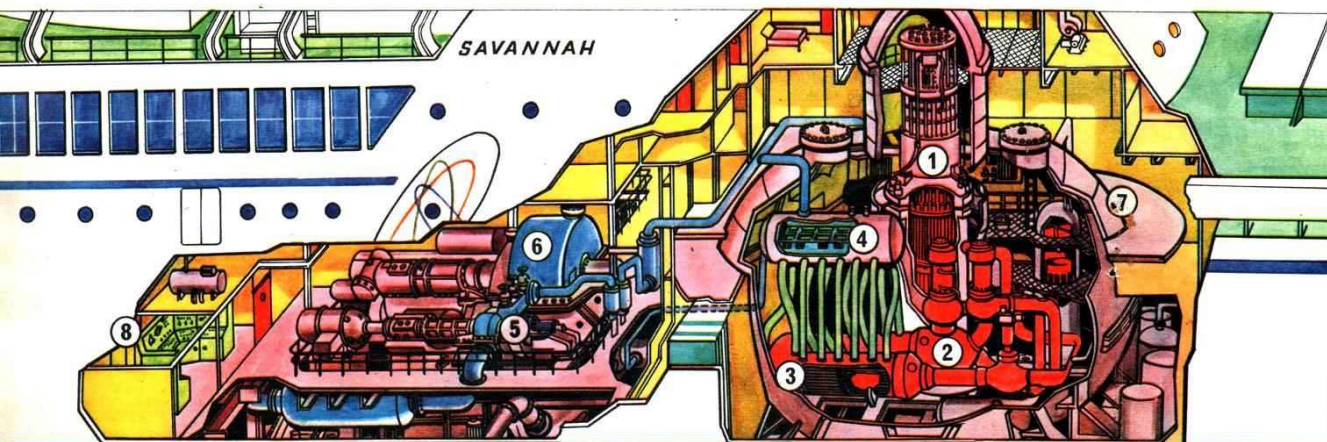


AFTER the discovery of atomic power it took men only a few years to prove that they could make sufficient bombs to blow all their enemies to bits.

Then the atomic scientists put their heads together and agreed that this great force of atomic power could be used as a tremendous

benefit to mankind instead of being a power for evil.

So in 1955 President Eisenhower of America proposed that his country should build the first ever atomic-powered merchant vessel to demonstrate to the world America's peaceful use of the atom.



1. Nuclear reactor.
2. The primary heat conversion system is marked in red. It contains pressurized hot water which is nearly three times as hot as ordinary boiling water.
3. Heat exchanger.
4. Steam drum. The section marked in blue shows the part of the machinery running as an ordinary steam turbine unit.
5. High pressure turbine.
6. Low pressure turbine.
7. Lead shielding surrounding whole of the nuclear reactor plant to protect sailors from atomic radiation.
8. Control panel.

THE *Savannah*, which was launched in 1959, bears a name which links it with another famous 'first' of ocean travel.

For in 1819 the first to cross the Atlantic using steam sailed from America to Liverpool. And its name was the steamship *Savannah*.

Atomic ships do not, of course, use coal or oil to drive their big turbines. Instead they use a nuclear reactor.

The fuel, called enriched uranium oxide, is in thimble-size pellets which are fed into the reactor. Because of the atomic reaction which then takes place, great heat is produced.

This heat is first harnessed in a heat absorption unit—which is a kind of boiler. Water kept under enormous pressure to prevent it from boiling absorbs the heat and carries it, at the equivalent of three times the temperature at which water boils in your kettle, to a heat exchanger.

This heat exchanger is the equivalent of the furnace in an ordinary steam-driven vessel. Here more water is boiled and turned into steam.

This steam is used to drive the two turbines that turn the propellers which drive the ship.

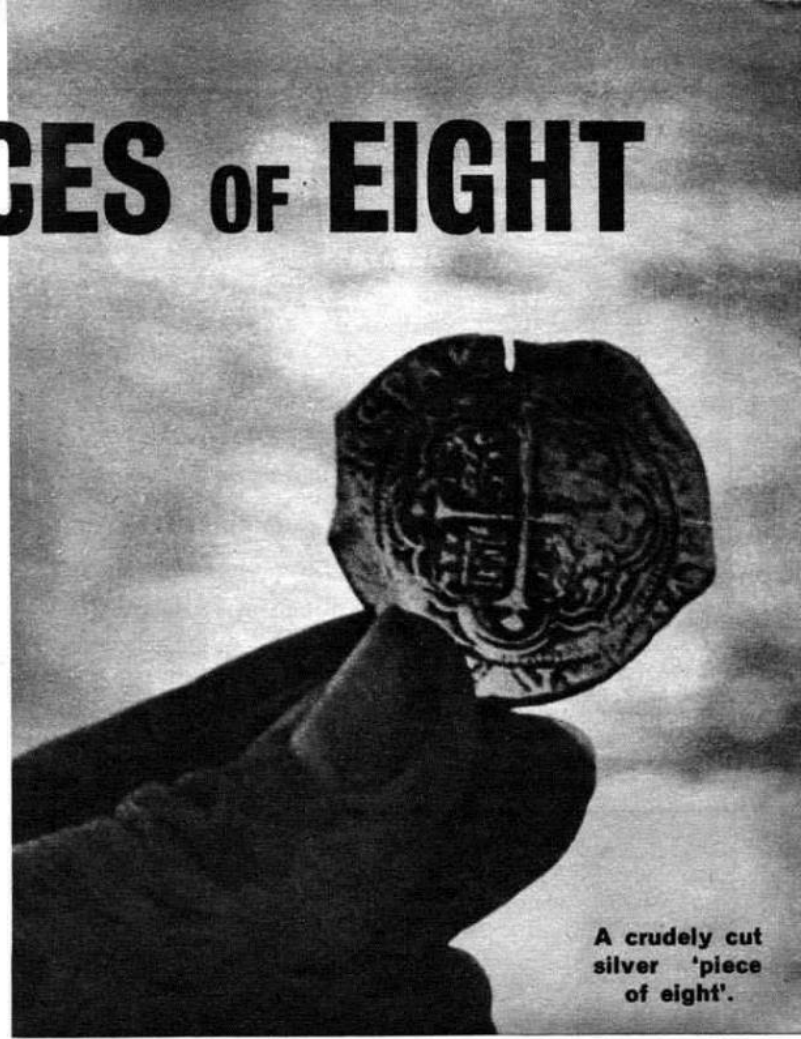
At a cruising speed of 21 knots, the Nuclear ship *Savannah* can travel 336,000 nautical miles—the equivalent of nearly twelve times around the Earth at the Equator—on a single load of fuel.

For an ordinary ship this same distance would require 90,000 tons of fuel oil.

The four reactor fuel elements on the left of this picture provide the *N.S. Savannah* with fuel equal to the barrels each filled with 100 gallons of oil and stacked pyramid fashion in a line stretching for nearly half a mile.



PIECES OF EIGHT



A crudely cut silver 'piece of eight'.

The skin divers scratched away at the silvery gleam on the seabed. Soon they have uncovered the 300-year-old secret of the Spanish Main—a fortune in silver buried beneath the sea.

DURING the late 17th and early 18th centuries, the great galleons of Spain sailed the treacherous waters of the pirate-infested Spanish Main.

More than a thousand million pounds worth of treasure crossed the Atlantic from Spain's conquered dominions in the West Indies and around the Gulf of Mexico.

Gold and silver bars, coins minted in Mexico, silver pieces of eight, golden doubloons, fabulous jewels, rich silks and delicate porcelain from the Orient—all were carried eastwards in the merchant ships escorted by cannon-carrying men-o'-war.

But in those days, as now, dangerous hurricane-force winds sometimes caught the heavily laden vessels and many of them sank in the sun-drenched waters of the Caribbean, often with the loss of all hands. Their priceless treasure lay hidden from the world on the bottom of the sea.

Recently, four young men who ran a water-ski-ing and skin-diving business on Grand Bahama Island had an amazing piece of good fortune when by accident they discovered the wreck of one of these galleons in only twelve feet of water!

For 300 years it had lain slowly rotting away on the sea bed barely

a mile off the beach of Lucayan. Then, one day, twenty-four-year-old charter boat skipper Gary Simmons peered down into the green depths and spotted a coral-encrusted anchor.

He returned later with his three friends, Jack Slack, Dick Tindall and Bissell Shaver. They dived down and found two old cannon near to the anchor, and unmistakable signs of an ancient galleon.

They brought the anchor to the surface and hauled it aboard their boat. It was encrusted with silver pieces of eight fastened to it by the living coral! The cannon, too, were covered with silver coins. Further dives revealed the whole treasure just as it had been scattered on the sea bed when the ship was swept on to the jagged reef all those years ago.

With mounting excitement the four men scratched away at the ocean floor, and within two hours they had dug up enough money to fill a wooden chest.

For the next few weeks Gary Simmons and his friends visited the wreck as often as they could, and soon they were collecting large quantities of treasure.

At first they did not think the silver pieces were much good (Pieces of Eight are rough, crudely shaped coins sliced from silver bars with a chisel and then roughly





The treasure hunters (above) check a day's haul of silver. Below and left: They dive for the coral-encrusted coins.

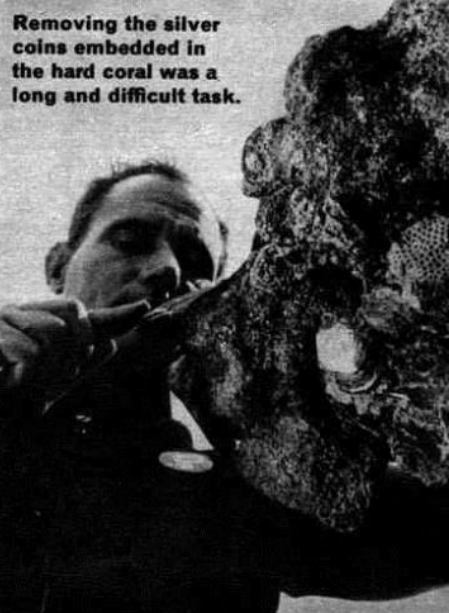


stamped with a cross and the date), but in fact they had found extremely rare coins of great value, and the whole treasure may be worth over £3,000,000.

When they reported their amazing find to the Bahamian Government, they were told to keep their information on its position secret, and were forbidden to sell a single piece of it until it was decided what their share should be.

Meanwhile the four men worked on, diving and dredging until they had collected so many coins and other objects that they had to accept the offer of a local bank to put it in their vaults.

After many months they were told by the Bahamian Government that they would be allowed to keep two-thirds of the value of the treasure — more than enough to keep them rich for the rest of their lives!



Removing the silver coins embedded in the hard coral was a long and difficult task.

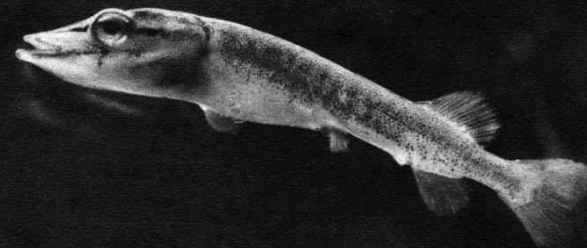
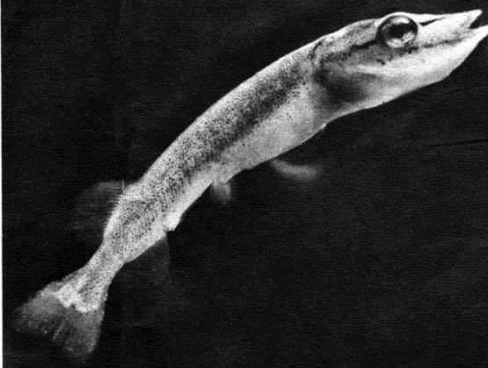
PIKE EATS PIKE



THE pike is the largest and fiercest predatory* fish in British lakes and rivers, and as you can see from these remarkable pictures, it is not above eating one of its own kind. The jaws of a pike are armed with hundreds of razor-sharp teeth most of which cover the roof of its mouth. They are all backward sloping so that when it grabs its prey, providing it doesn't let go, there is only one way for its victim to go—down! A pike can stretch its jaws so wide that looking down its throat is like looking down a great tunnel. This enables it to swallow fish almost as big as itself. Fishing for pike is an exciting sport and anglers who hook one are sure of a tremendous fight. The record catch for a pike is one weighing 53 lb. which was caught in Ireland in 1920.

** A predatory animal is one which lives by hunting and killing other animals.*

1



You know that one and one make two.
That's quite a simple sum to do.

2



But now divide one into one.
How easily can that be done?

3



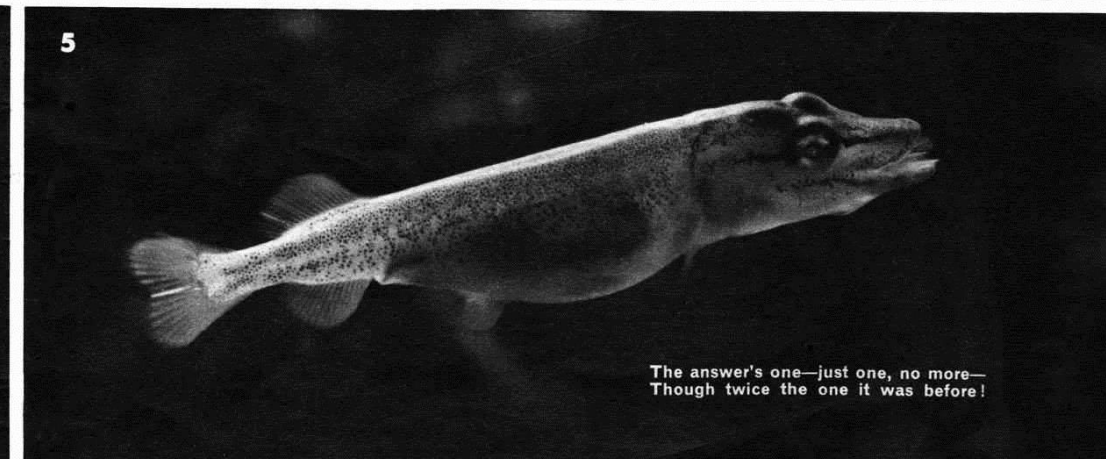
Perhaps you think it doesn't go.
That some remainder ought to show.

4



But anyone who's keen and quick
Can learn to do arithmetic.

5



The answer's one—just one, no more—
Though twice the one it was before!

RANGER

THE NATIONAL BOYS' MAGAZINE

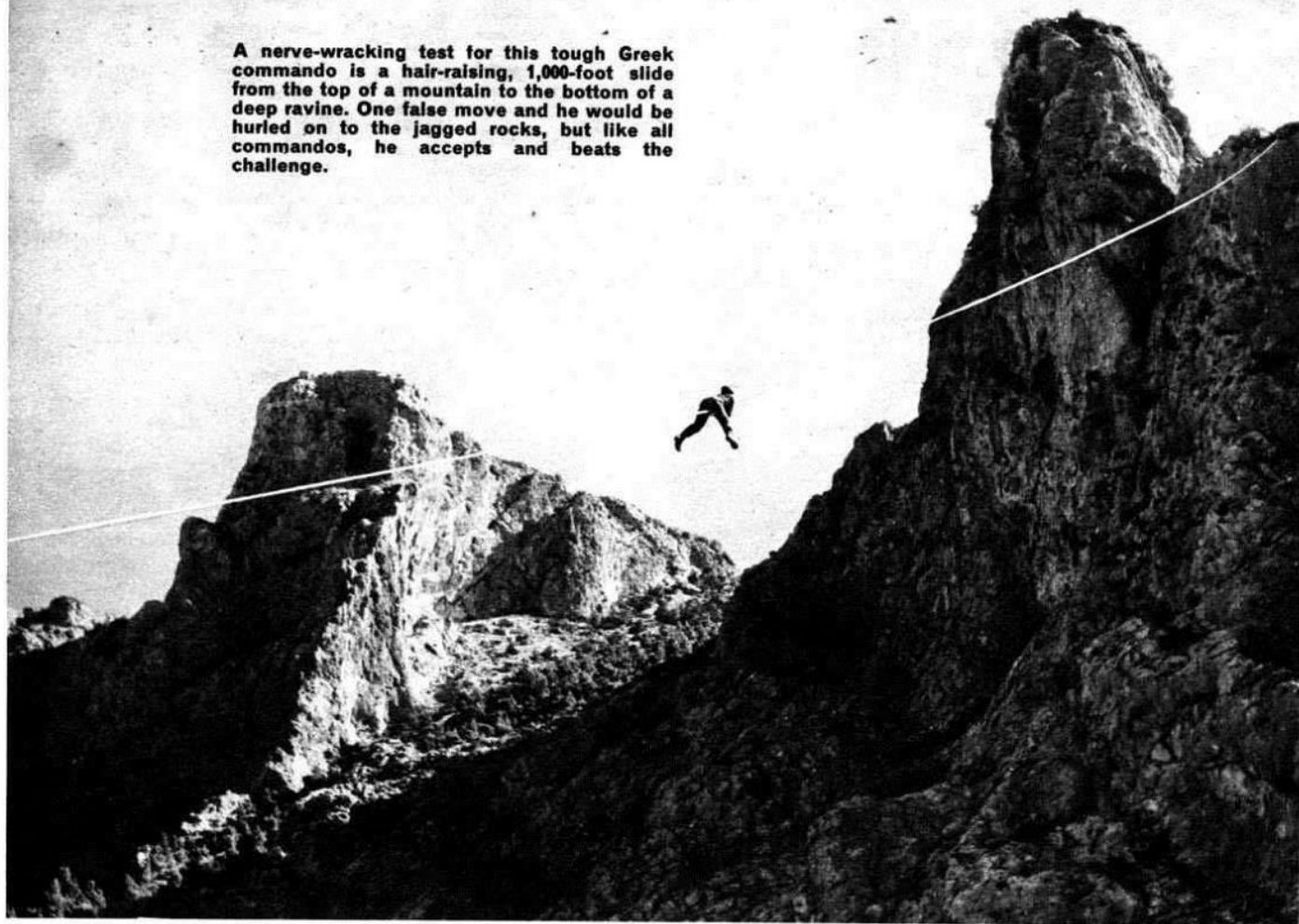
EVERY MONDAY

*The Death of an Aircraft—
IT REALLY HAPPENED!
Astounding real life
photos inside*



OCT·16·1965 1¢

A nerve-wracking test for this tough Greek commando is a hair-raising, 1,000-foot slide from the top of a mountain to the bottom of a deep ravine. One false move and he would be hurled on to the jagged rocks, but like all commandos, he accepts and beats the challenge.



YOUR world



FEELING down in the dumps? Does the world seem dull and flat to you today? If it does, then take a look at these pictures and you will soon have that great 'up in the air' feeling. All the people in them—whether they are at work or at play—are proving that the world can be just as exciting as you care to make it.

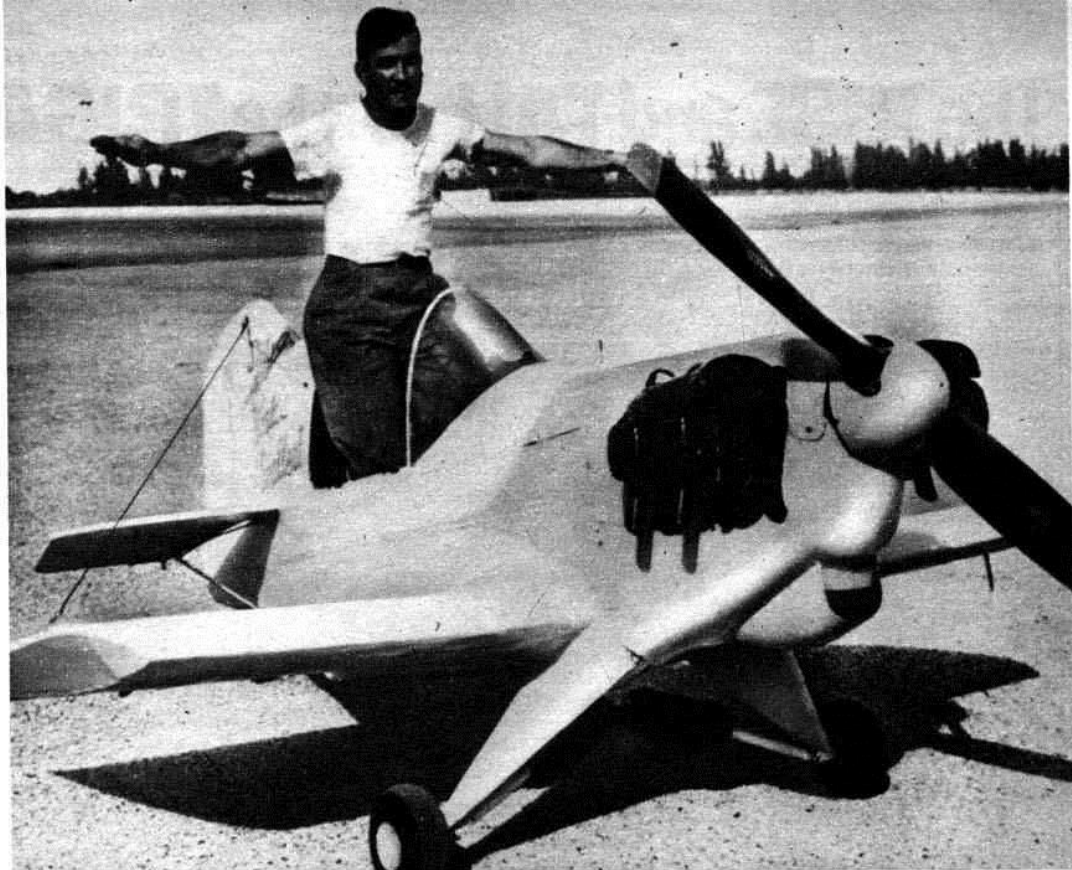
◀ Whoosh! An expert skier needs no bridge to cross this road in Zürs, Arlberg, Austria. Hurting down the ski-run at nearly 40 miles an hour he clears the car by a good ten feet. Average speeds for holiday skiers is about 30 m.p.h., but experienced sportsmen have been known to reach speeds of nearly 70 m.p.h. in racing events.

YOU CAN LAUGH but it's true!

● When volunteer firemen at Ridgefield, New Jersey, held their annual inspection parade they wore their best uniforms and planned to have a banquet afterwards. Half-way through the parade they received a fire alarm call. It was from the restaurant where they were to have had their banquet. And their steak dinner was burnt to a cinder!

● A man and his wife out shopping in the busy High Street of Honiton, Devon, found themselves separated on opposite sides of the road. To save the wife crossing in the dense traffic, the man threw her purse over to her. It landed on top of a passing car and has not been seen since!

● Mr. Deavin of Marston Green, Birmingham, gave up his glasses and their case for lost when they slipped out of his pocket into the sea as he pedalled a cycle-float off the island of Majorca in the Mediterranean. But two months later another holidaymaker, skin-diving off the north Italian coast 500 miles away, found them and posted them back to him.



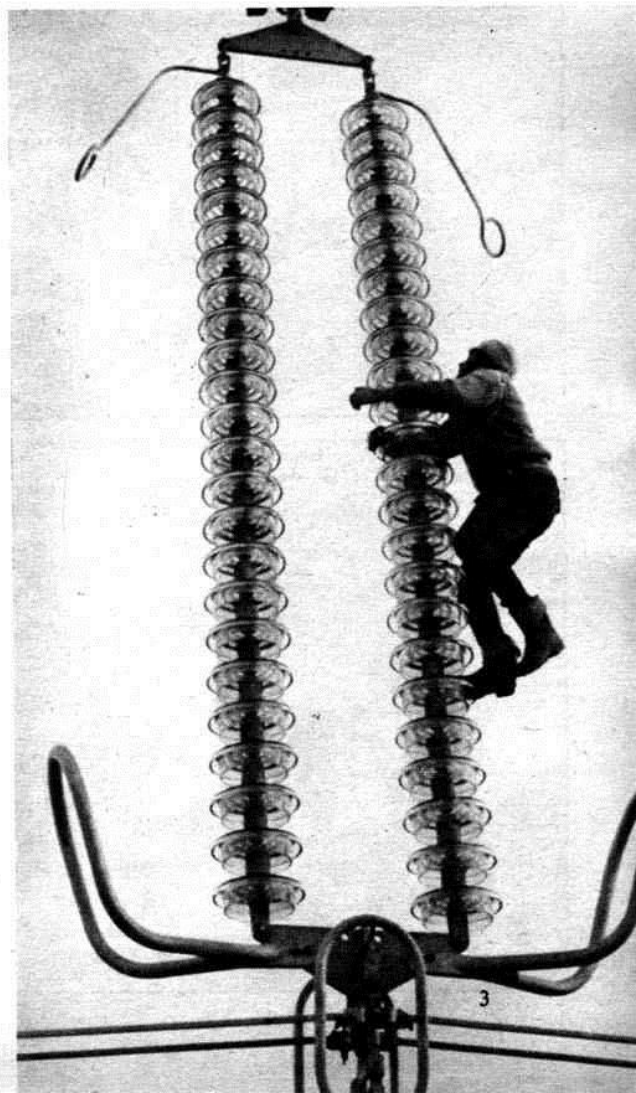
▲ Claimed to be the smallest aircraft in the world is this tiny low-winged monoplane. It has a wing-span of 9 ft., only three feet more than the man's outstretched arms.

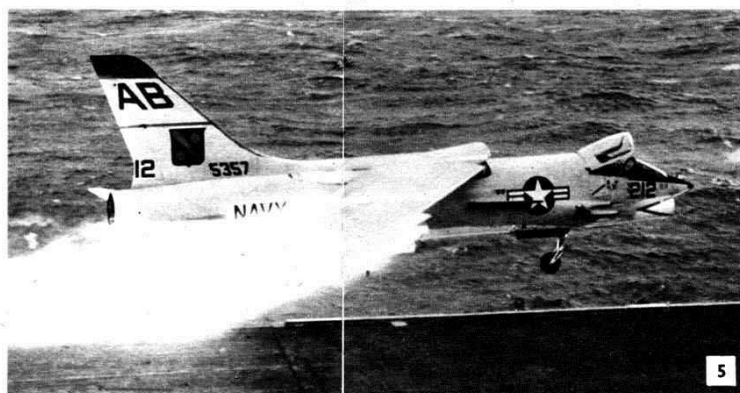
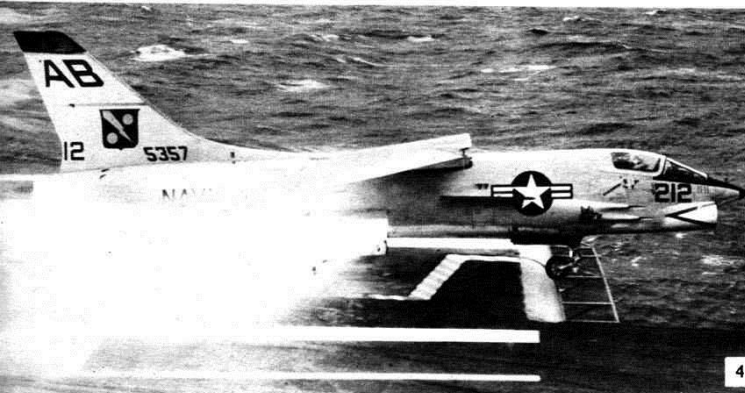
▼ This is not a 'human fly' act in a circus, but a man doing an everyday job of work. He is assembling huge glass insulators on a pylon carrying electricity cables.

TODAY



▲ High in the air over an airfield near Chobham in Surrey, this girl thrills the crowds as she stands on the wing of a Tiger Moth aircraft. The special harness prevents her being dragged off by the slipstream.





DEATH of an AIRCRAFT

A jet-fighter dies—and a man lives.

TO the pilot coming into land on the aircraft carrier it seemed just like the end of another ordinary flight.

But what happened in the next two or three seconds made it a landing which Lieutenant John Kryway of the United States Navy, will never forget.

For, as his F8 Crusader jet fighter touched the flight deck at nearly 150 m.p.h. (picture 1) one of its landing wheels buckled.

The skidding metal undercarriage became so hot that it started a fire that spread along the plane (2 and 3).

Heart in mouth, Pilot Kryway fought to bring his plane to a stop. But the blazing jet hurtled to the edge of the aircraft carrier (4).

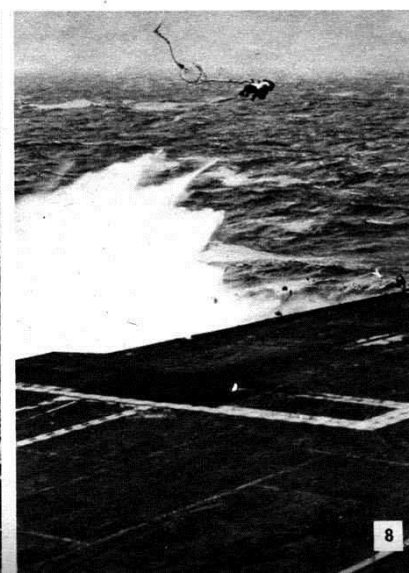
Then the pilot made the split-second decision which saved his life. He pulled the trigger which

fired his ejector seat—a safety device which enables a pilot to be thrown out of his plane and parachute from a low level. The roof of his cabin opened automatically (5) and he was shot, still sitting in his seat (6) 170 ft. into the air with the detached cabin cover flying off behind him.

As the doomed plane plunged into the sea (7) the smaller of the pilot's two parachutes pulled out the larger one (8) from the pack strapped on his back. The seat fell away and the larger parachute opened a moment before he landed in the water (9).

All the pilot got was a wet flying suit and a soaking—but a soaking he is not likely to forget for the rest of his life!

Air forces all over the world use ejector seats in their war planes and already more than a thousand pilots owe their lives to this British invention.



IT TOOK TEN AIRCRAFT TO MAKE THE

CONCORDE

FOR nearly 500 years, since the five weeks it took Christopher Columbus to cross the Atlantic Ocean in 1492, man has been constantly whittling down the time it takes to cross the great sea that separates Britain and Europe from America.

Today, in 1965, he has succeeded in reducing the duration of the journey to a mere seven hours.

But man has never been content with his latest achievement. And now he plans to cut the time of the Atlantic crossing by

more than half with the Concorde, an airliner which is being built co-operatively by the British and French governments.

Over the last few years these two countries have developed military aircraft capable of flying at speeds in excess of 1,500 m.p.h. You can see some of these aircraft on these two pages. Now the time has come to use the experience gained with these aircraft to build an airliner that will fly at the same speeds.

The Anglo-French supersonic Con-

corde is expected to be introduced into service in the early 1970s. It will fly the Atlantic in three hours at a height of 10 miles above the sea.

When you are grown-up such speeds will seem a normal part of everyday life. But even then aircraft experts will be planning to cut down the flying time still further.

Your grandsons will probably chuckle when you tell them that you flew to America in three hours.

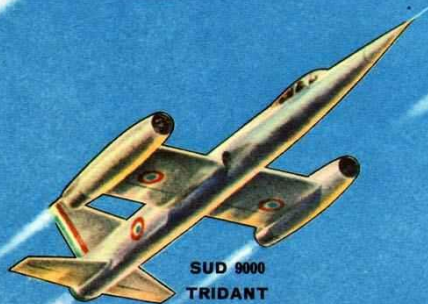
"How terribly slow," they will say . . .



MIRAGE III



MIRAGE IV



SUD 9000
TRIDENT



NORD GRIFFON



SUD 212 DURANDAL



FAIREY DELTA 2

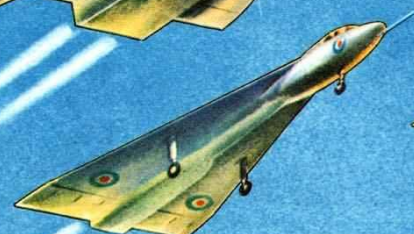


When the British and French aircraft designers decided separately to plan a supersonic airliner they discovered that because their findings were so similar it was better to collaborate. So the Concorde project was born.

The reason for the similarity was that both countries had built up a store of similar experience in supersonic military and research aircraft. In these pictures you can see how both countries evolved towards a similar shape—the shape of the Concorde. The British Fairey Delta 2 was a forerunner of the Lightning. Then came the T.188, the HP.115 and the T.221, which is very like the Concorde in design.

Over the same period the French Sud 212 Durandal gave way to the Sud 900 Trident. Then came the Mirage III, the Nord Griffon and the Mirage IV.

If you compare the British T.221 with the French Mirage IV you will see at once that it was much more sensible for the two countries to plan together than to go their separate ways.



HP 115



T221



LIGHTNING



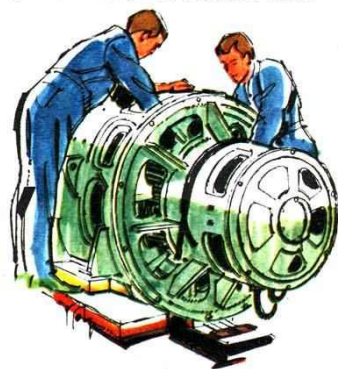
T118

A Modern Diesel Railway Engine



Servicing a diesel locomotive is highly skilled work performed in special sheds built for the purpose. For major servicing the roof of the locomotive opens and the whole diesel electric unit can be lifted out. If necessary a complete replacement unit can be dropped in.

Engineers adjust the brushes of the diesel's generator through the inspection hatch.



AROUND the bend in the line glides the diesel goods locomotive with scarcely a tremor coming from its smooth green hull.

As you watch it pulling its load along the track you begin to wonder and then to marvel. Wagon after wagon clacks over the rails behind the diesel locomotive, following it like an endless line of ducklings in the wake of Mother Duck.

In the end you give up counting wagons. These diesels seem capable of pulling anything!

That was what railwaymen thought as long ago as the 1930s, when experi-

ments showed that two diesel locomotives could do the work of five steam engines. After that, the railways decided to change to diesels generally.

Today there are more than 2,500 main line diesel locomotives, 2,000 shunters and 4,000 multiple unit vehicles in operation on Britain's railways. No other country in the world has achieved so big a changeover from steam to diesels in so short a time. Of the 18,000 steam locomotives puffing along our lines ten years ago, only 5,000 are left.

Diesel locomotives require a very high standard of servicing and maintenance and skilled mechanics carry

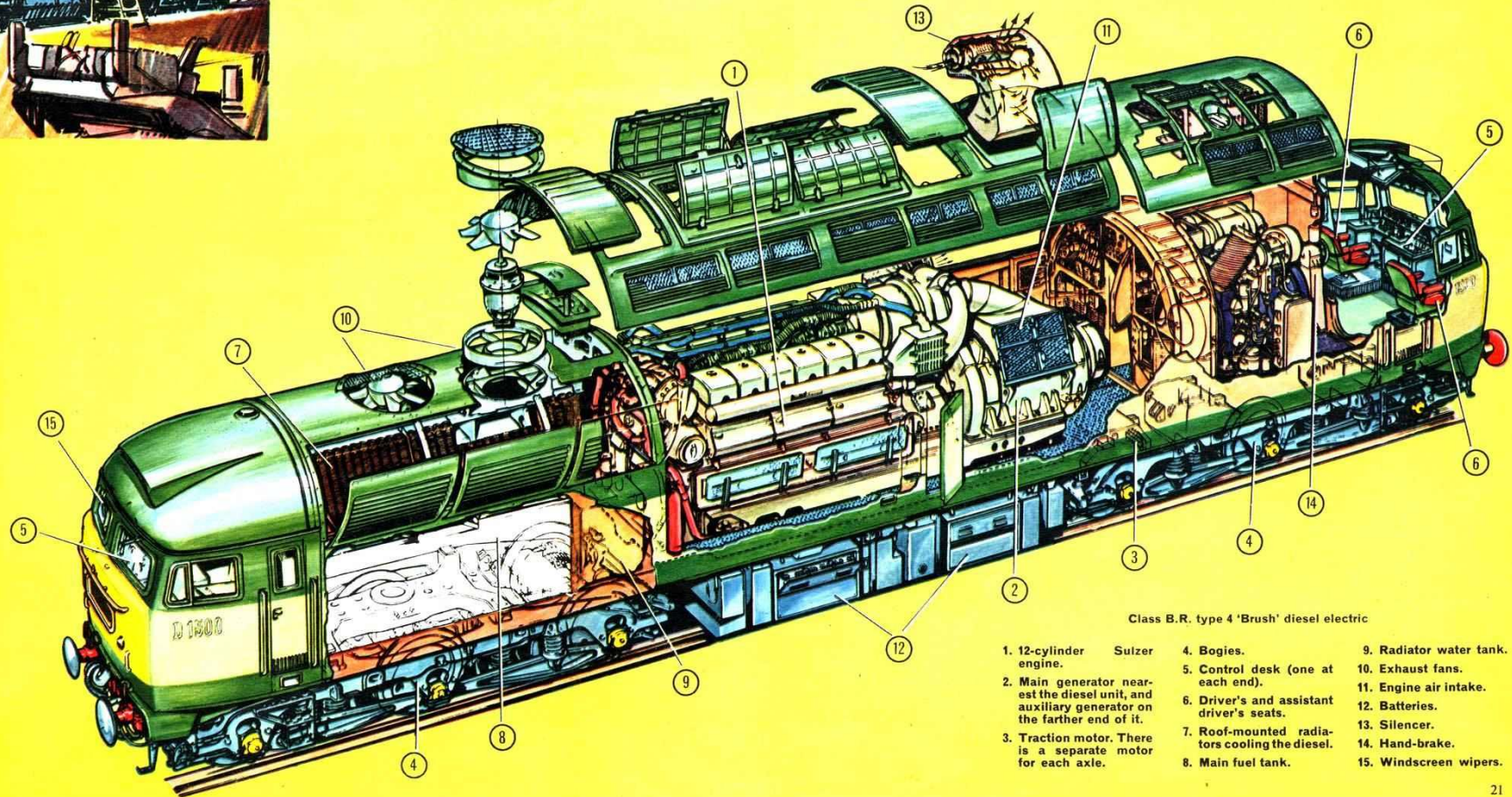
out this work in depots which have been specially designed for the new locomotives.

Our drawing this week shows a Diesel-Electric 2,750 h.p. locomotive. It has a Co-Co wheel arrangement, which means that it has two bogies each with three axles (six wheels) all of which are driven. As you can see, the power unit is mounted in the centre of the locomotive.

Diesels may not have the romance and excitement of the great steam engines of the past. But they are much more efficient and much cleaner for the engine crew to operate.



Diesels are so clean that the driver goes to work in a white shirt and has no need to change. The crew have their own private toilet, a wash basin and "breakfast cooker."



Class B.R. type 4 'Brush' diesel electric

- | | | |
|--|---|-------------------------|
| 1. 12-cylinder Sulzer engine. | 4. Bogies. | 9. Radiator water tank. |
| 2. Main generator nearest the diesel unit, and auxiliary generator on the farther end of it. | 5. Control desk (one at each end). | 10. Exhaust fans. |
| 3. Traction motor. There is a separate motor for each axle. | 6. Driver's and assistant driver's seats. | 11. Engine air intake. |
| | 7. Roof-mounted radiators cooling the diesel. | 12. Batteries. |
| | 8. Main fuel tank. | 13. Silencer. |
| | | 14. Hand-brake. |
| | | 15. Windscreen wipers. |

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

**SKY
LIFT**

See pages 6 and 7



OCT · 30 · 1965 1¢



SHOCKS! Surprises! Laughs! Dangers . . . ! the world is full of them. Just when you think life is becoming a bit of a bore, along comes something you never expected. And as you can see on these two pages, sometimes there is someone on the spot with a camera to record it . . .

It was a shock for press photographer Arthur Sidey who took these breath-taking pictures of a crashing racing car. It seemed just another routine job for Arthur when he turned up to take pictures of a trophy race at Snetterton, Norfolk. Then, suddenly—**DANGER!** Graham Hill, driving a B.R.M. skidded on the wet track at 100 m.p.h. "I thought he'd straighten up and carry on," said Arthur afterwards, "but I realised he was coming straight at me. Some instinct made me keep taking pictures and before I had time to duck he roared straight over my head. For a second or two I thought I had taken my last picture." But it was Arthur's lucky day—and Graham Hill's too. He got out of his wrecked car and walked calmly away.



Laugh at one of Nature's strange jokes. This is the odd puffer fish which is normally quite small and a tempting morsel for larger fish. So when danger threatens the puffer blows himself up to several times his normal size to frighten his foes away.

YOUR





THINGS THAT MADE THEM GASP!

● Nineteen Americans wearing Highland dress, could not toss the 19 ft. 5 in. caber at the annual Scottish Highland Games in Hertford, Connecticut. Bit by bit they cut it down to 12 ft. 8 in.—then a 23-year-old man from New York managed to get it off the ground and won! The caber used in the real Highland Games in Scotland weighs 12 stone—and is just over 17 ft. long!

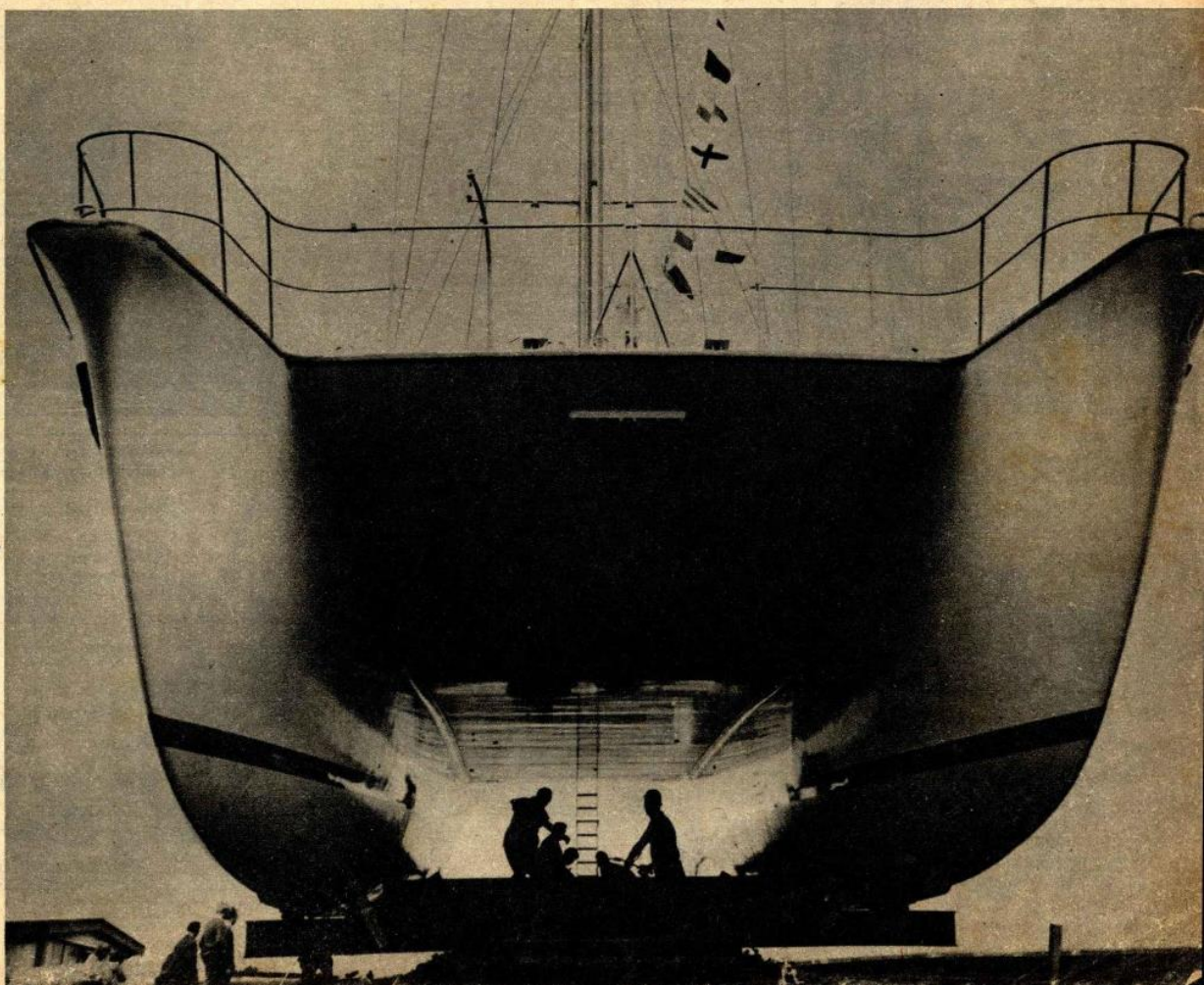
● When firemen opened the door of a burning hot-dog depot in Manchester, out rushed a very hot dog indeed! It was an Alsatian guard dog whom they think might have started the blaze by chewing a box of matches which set the cardboard cartons alight.

● Andy, a six-foot-six long Anaconda snake, slithered down a drain in Madera, California, and his owner gave him up for lost. But a month later, the local sewer inspector opened up a manhole a mile away and nearly fainted when he saw Andy staring him in the face. Now Andy is back with his delighted owner.

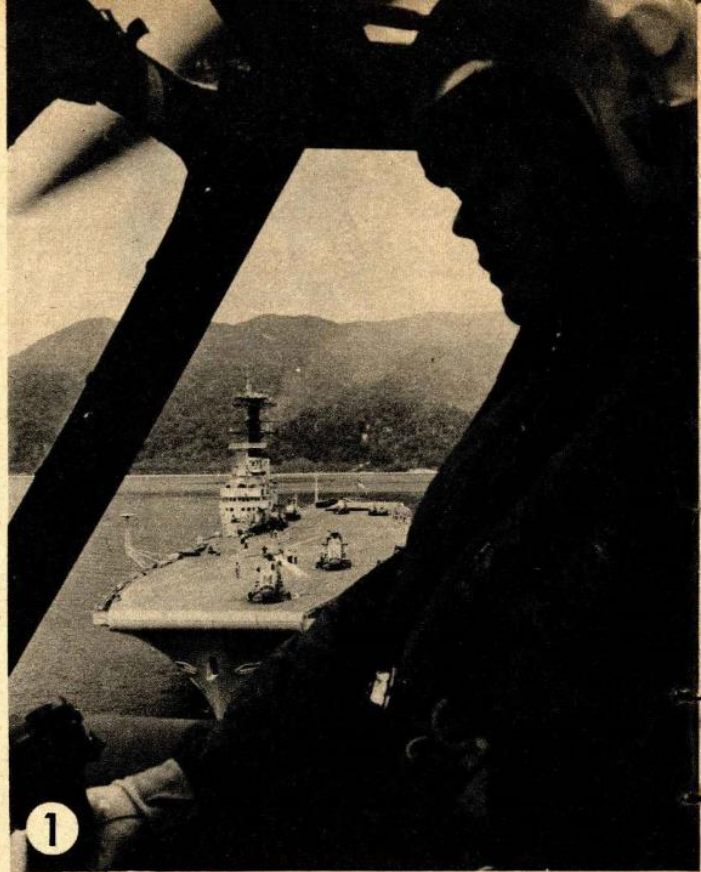
world TODAY

Surprise for two holidaymakers in Spain when they saw this huge waterspout looming up. It passed by—luckily, because these great columns of mist and water whipped up hundreds of feet by a whirlwind, can do a great deal of damage.

Unexpected angle on this shapely hull of a giant catamaran makes an unusual picture. It was taken before the launching at Canvey Island, Essex. It is 77 ft. long and the hull is divided into separate halves which make it practically unsinkable.



OPERATION SKY-LIFT



The Royal Navy's 'maid of all work'—that's the helicopter! Able to land almost anywhere, and to unload troops and equipment while airborne, this wonder-machine plays a vital role in the armed forces of today. Royal Marine Commandos, based on the commando carrier *H.M.S. Bulwark*, use helicopters to get them quickly to trouble spots. 1. *H.M.S. Bulwark* in port, seen from a helicopter cockpit. 2. The Wasp, a small helicopter, is used as a runabout for guided missile destroyers. 3. A Marine Commando signals a helicopter bringing supplies in the Middle East. 4. Fresh from the trip—and ready to fight! A Commando squad leap from their helicopter.



5

5. "Steady, there!" A commando supervises the loading of a jeep. Helicopters are often used to carry motor transport over short distances where there are no roads.



6

6. Commandos set down in the middle of a fighting zone by rope. The helicopter has proved itself valuable in carrying small, highly mobile fighting units.

7. A more peaceful use for the helicopter—in air-sea rescue operations. This man was rescued from a blazing tanker in the Middle East. Taken off by a merchant ship, he was transferred in a helicopter to *H.M.S. Bulwark*, where he was given first-class medical attention. There are many air-sea rescue units in the armed forces.



7

LOOKING INTO THINGS

The COLOSSAL CRANE

THIS enormous machine is no ordinary crane. Although it has a jib or boom like a crane and lifts heavy loads of materials, it is in fact called a Dragline.

Made by a British firm of engineers, it can move from place to place by WALKING. Great feet operated from inside the control cabin enable it to waddle slowly like some fantastic metal monster.

The Walking Dragline, which weighs nearly 1,800 tons and is the largest of its kind in the world, is used to obtain coal from open-cast mining sites in various parts of the country. In some areas, coal seams are near the surface and it is easier to dig huge trenches in the earth to reach the coal than to sink shafts in the normal way.

The big steel 'bucket' which hangs from the end of the jib, is dragged along the ground by the cable attached to the pulley above it. As the 'bucket' scrapes along it gathers up a giant-sized mouthful of earth or coal which can then be swung round and loaded on to lorries.

Only one man is needed to operate the Walking Dragline, and working non-stop the machine can dig out its own weight of earth or coal in an hour.

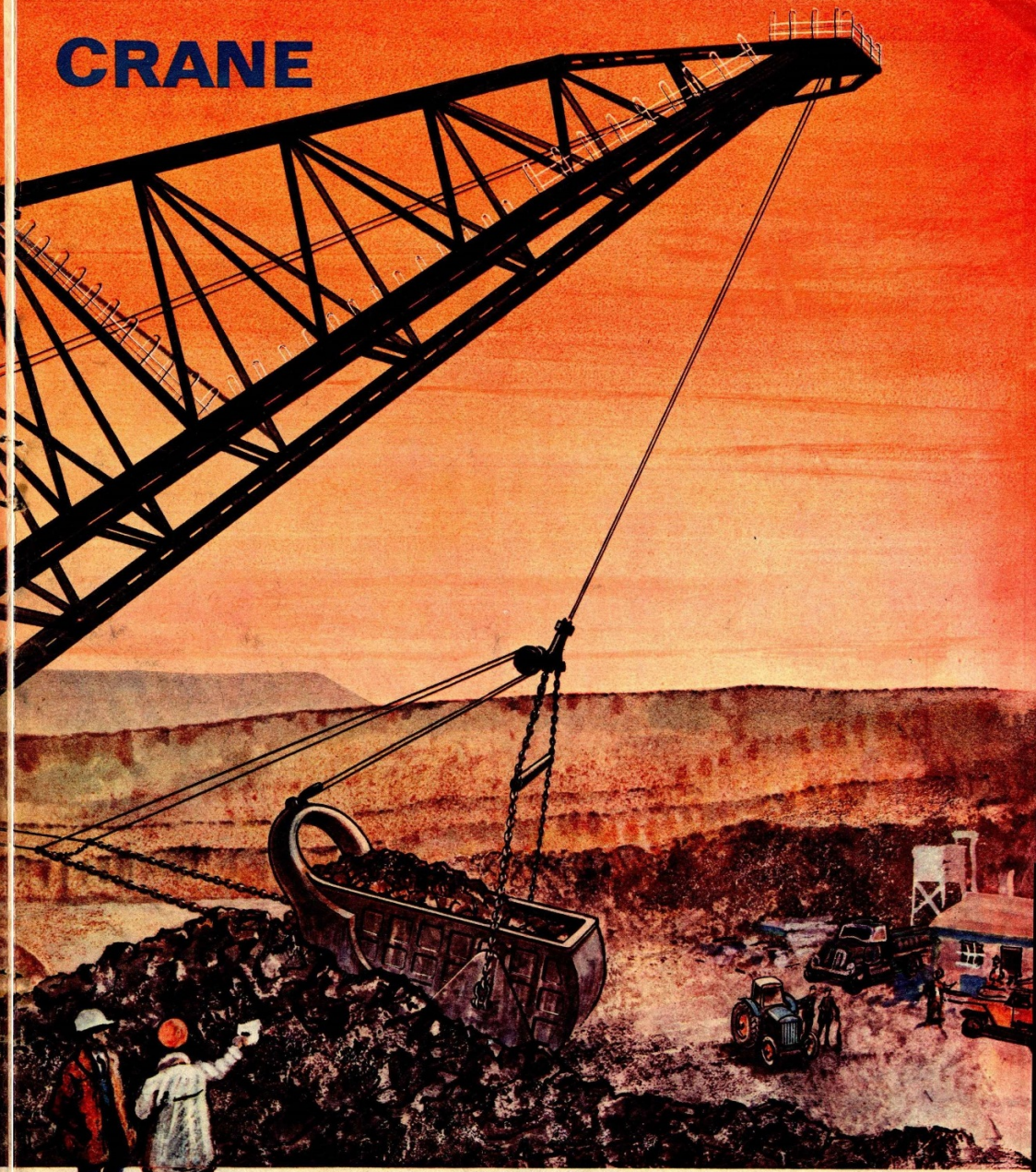
Now, for more details of this marvel of engineering, read the caption at the foot of the page.



THE Walking Dragline's massive feet are each 55 ft. long and 9 ft. 6 ins. wide. The legs are driven by huge wheels mounted each side of the central power-house. These wheels are off-centre, making them what is called 'eccentrics'. As they rotate, they first push the feet down on to the

ground. The feet lift the whole crane off the ground, swing it forward and lower it down again on its base. The feet are then moved into position to make the next step forward. The Dragline has a stride of 7 ft. 7 ins. but it would take it nine hours to walk a mile. Inside the power-house are the

main winding drums for the cables which lift and drag the 'bucket', and also the 'walking' machinery. An electric cable carrying 5,600 volts is connected to the power-house. Each of the winding drums is driven by four 300 b.h.p. electric motors. Other motors operate the turning machinery and also



the rotors which move the feet. The one man controlling the entire colossus sits in either one of the two glass-fronted control cabins. If the 'bucket' is being swung to the right he uses the right-hand cabin. If loading is being done into lorries on the left-hand side he sits in the left-hand cabin. Thus

he has the best view of the area over which he is working. The 'bucket' will hold 40 cubic yards of dirt. Imagine a garage 8 ft. high, 9 ft. wide and about 17 ft. long—the 'bucket' could hold a car and still have room for a workbench at one end!

RANGER

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EVERY MONDAY



THE
MOTOR CYCLE Speed on
two wheels

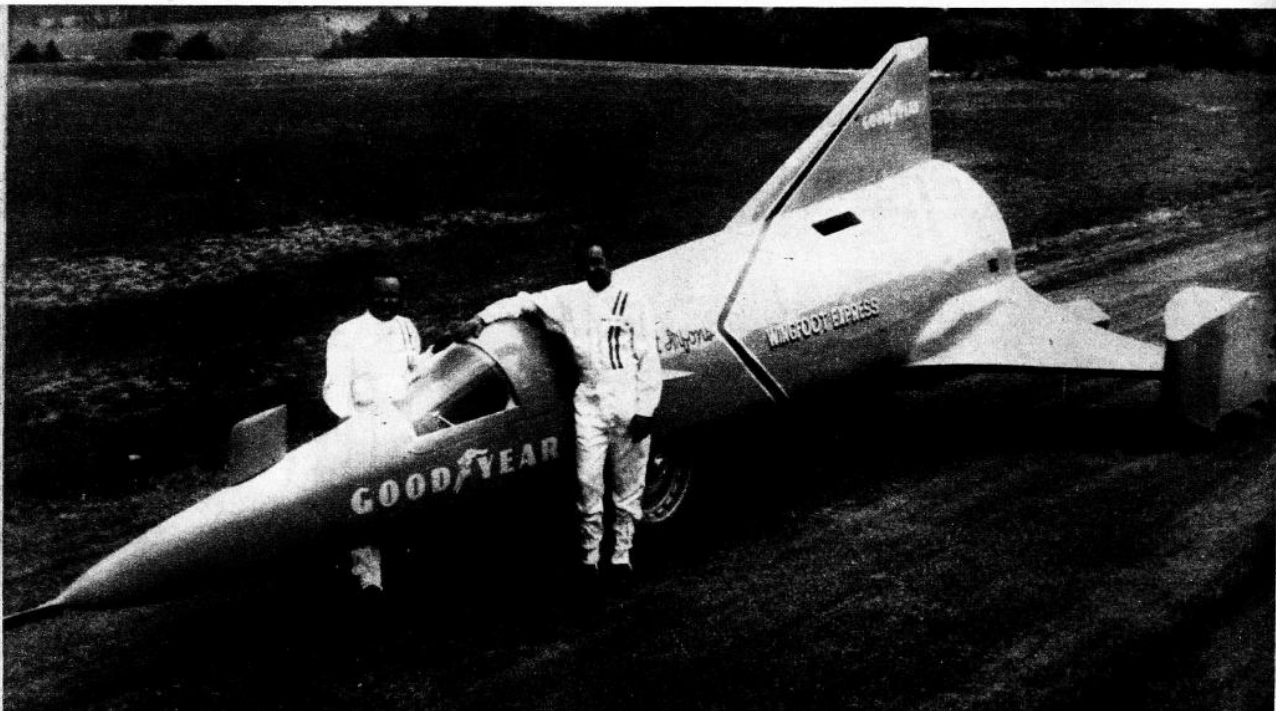
SEE PAGES 20 & 21

NOV · 6 · 1965 1/-



Mary, Mary, quite contrary, how does your "banger" grow?
With cockleshells, silver bells and spark plugs all in a row!
Every morning, the daughter of a publicity-minded garage owner on the main road between Bristol and Gloucester, waters the flowers on her father's 1937 Morris Eight. The car is driven back into the garage every evening and locked up for the night. Reason? People pick the flowers when nobody is around!

American car builder Walter ("Art") Arfons (left) and driver Bobby Tatroe plan to attack the land speed record with their rocket-powered car, the Wingfoot Express. Although the land speed record for 'automobiles' — cars with four wheels and the engine connected to two of them — is held by Britain's Donald Campbell at 403.10 m.p.h. Walter Arfons earlier jet-powered car travelled at 544.13 m.p.h. last year. His new car (pictured right) has two Jato rockets and is the first rocket-propelled car to attempt the land speed record.



YOUR

**WELL,
WOULD
YOU
BELIEVE IT?**

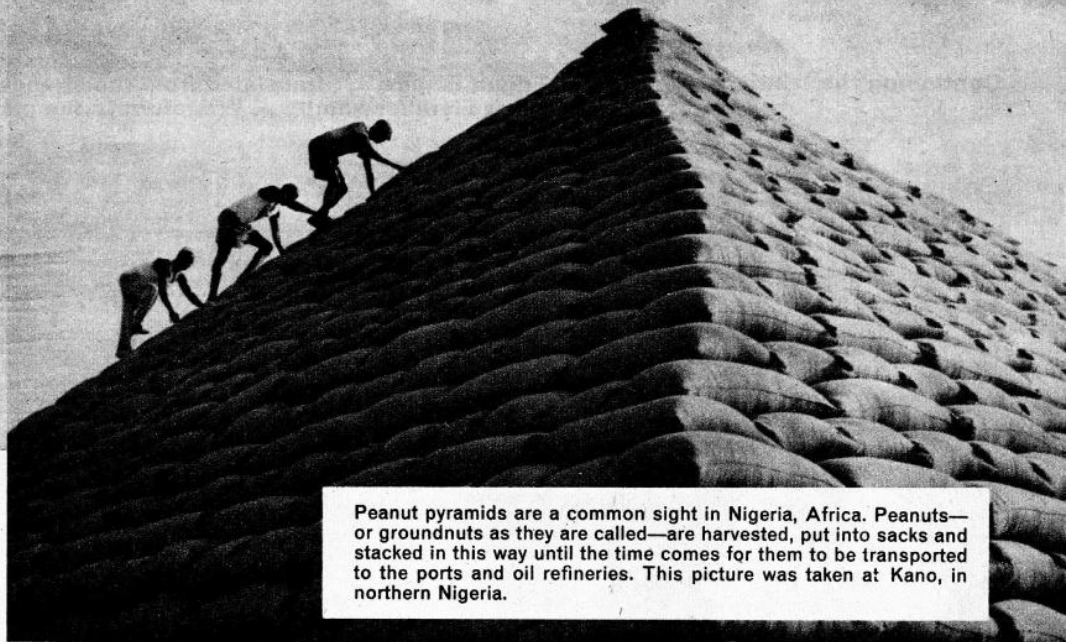
● A detective driving a patrol car in Coalville, Leicestershire, got a shock when he saw his own private car being driven along in front of him. He gave chase and caught the thief, but not before his car had been crashed into a lamp-post!



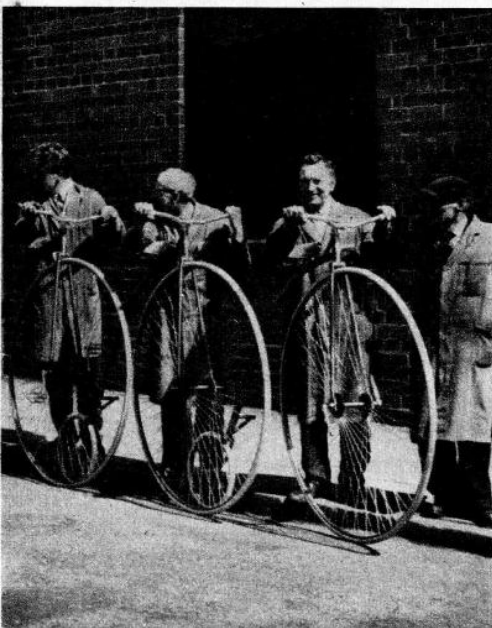
One and a penny three farthing's worth of penny-farthing bicycles line up outside a factory in Birmingham. The first penny-farthing was made in 1871, but these are brand new. They cost £100 each to make and are part of an export order received from America.

WORLD TODAY

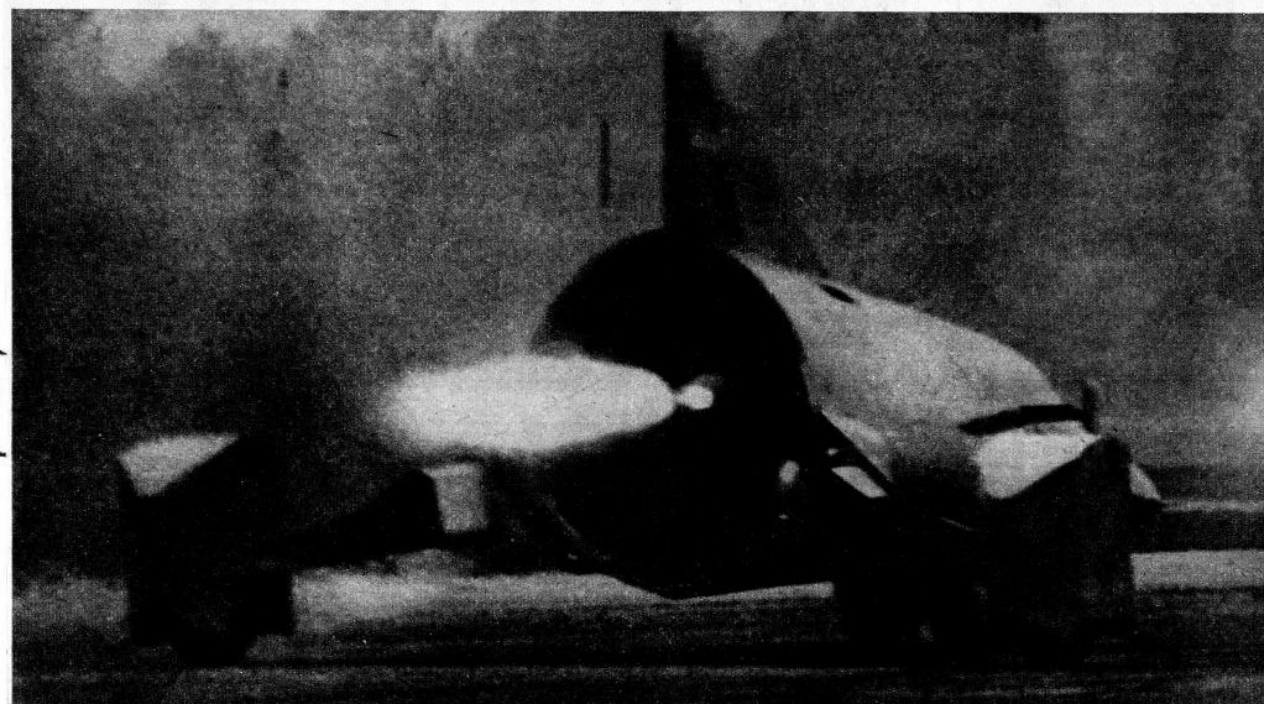
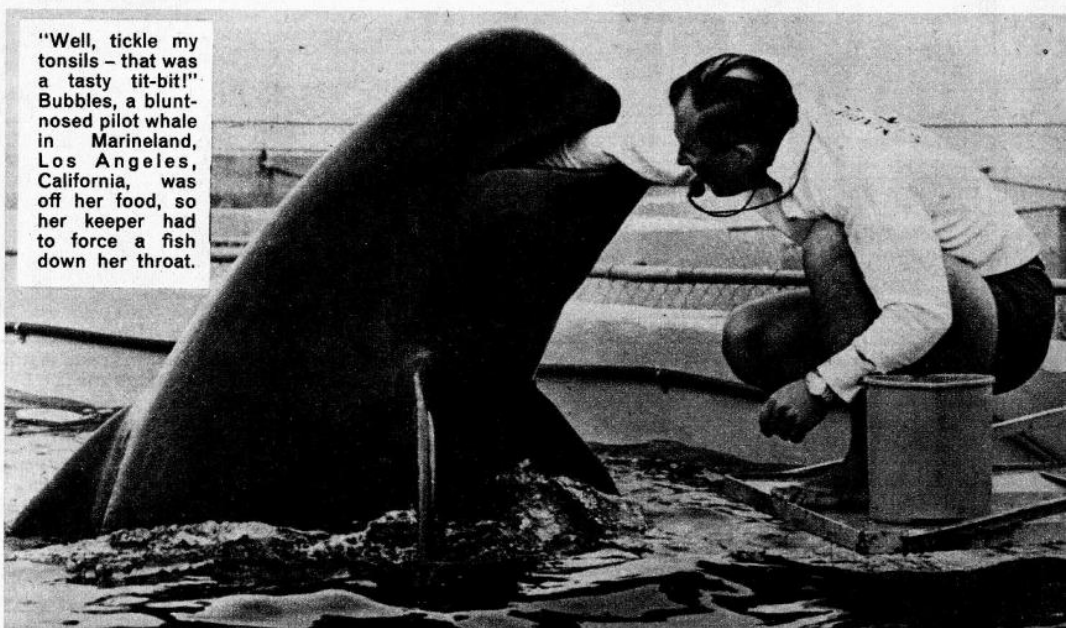
● Police in New Jersey, U.S.A. have issued the description of a house which has been stolen! It was a wooden framed, two-bedroomed house which had been bought by the State Highways Department. Officials checked it just before dark one evening, but next morning all that was left were the foundations! Someone had dismantled it and driven off with it during the night.



Peanut pyramids are a common sight in Nigeria, Africa. Peanuts—or groundnuts as they are called—are harvested, put into sacks and stacked in this way until the time comes for them to be transported to the ports and oil refineries. This picture was taken at Kano, in northern Nigeria.



"Well, tickle my tonsils – that was a tasty tit-bit!" Bubbles, a blunt-nosed pilot whale in Marineland, Los Angeles, California, was off her food, so her keeper had to force a fish down her throat.

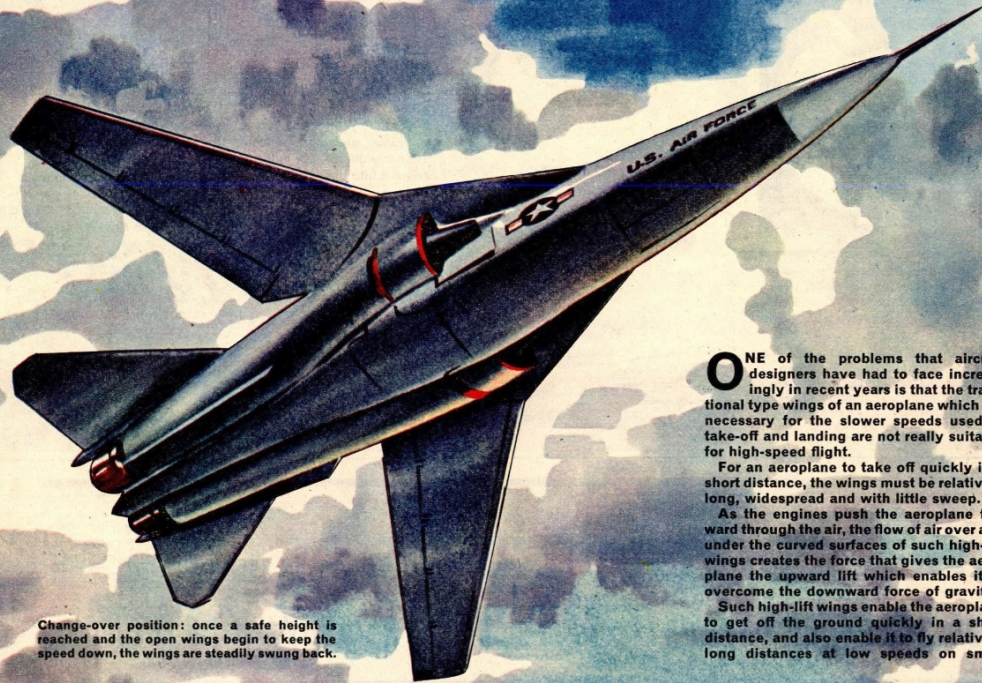


A shimmering haze of heat surrounds the rear of Wingfoot Express as its powerful rocket motors burst into life (left), during a trial run at Akron, Ohio. The needle-like nose of the car has a sighting fin mounted just in front of the cockpit to help the driver keep the car on a straight course. The car also has an air-speed indicator similar to that used in modern high speed jet planes.

Arfons will make his attempt on the record on the Bonneville Salt Flats in the State of Utah towards the end of this year, so by the time you read this he may well have beaten his own record.

INTO THE BLUE . . . ace test pilot NEVILLE DUKE reporting

'PLANE THAT SWINGS ITS WINGS



ONE of the problems that aircraft designers have had to face increasingly in recent years is that the traditional type wings of an aeroplane which are necessary for the slower speeds used in take-off and landing are not really suitable for high-speed flight.

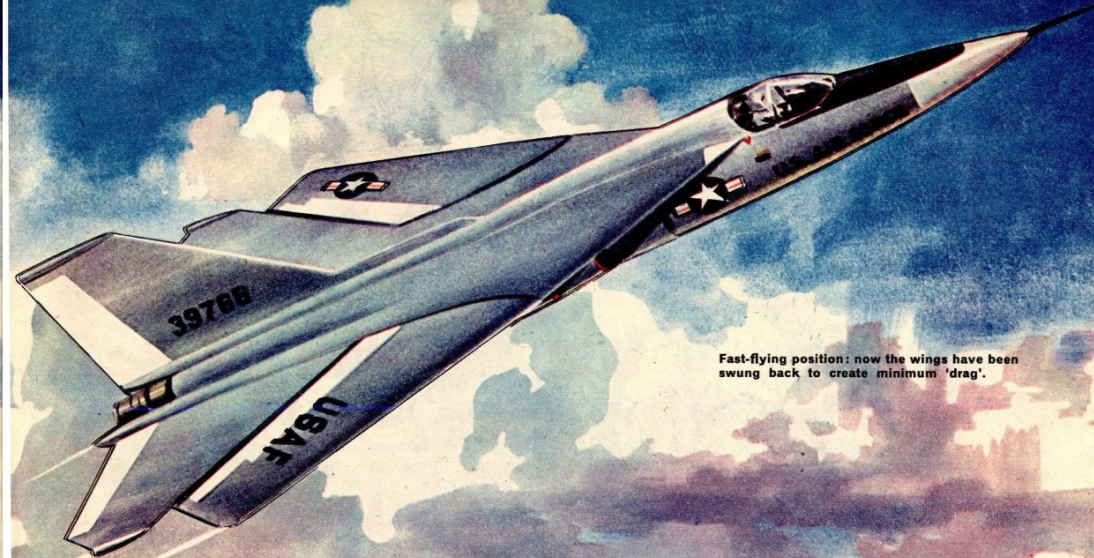
For an aeroplane to take off quickly in a short distance, the wings must be relatively long, widespread and with little sweep.

As the engines push the aeroplane forward through the air, the flow of air over and under the curved surfaces of such high-lift wings creates the force that gives the aeroplane the upward lift which enables it to overcome the downward force of gravity.

Such high-lift wings enable the aeroplane to get off the ground quickly in a short distance, and also enable it to fly relatively long distances at low speeds on small

Change-over position: once a safe height is reached and the open wings begin to keep the speed down, the wings are steadily swung back.

for RANGER readers!



Fast-flying position: now the wings have been swung back to create minimum 'drag'.

amounts of engine fuel, and to descend and land quickly in a short distance.

Unfortunately for aircraft designers, aircraft wings encounter more and more resistance from the air as they travel faster and faster. Wings of the high-lift type encounter so much resistance (drag, the engineers call it) that such wings cannot efficiently be pushed to speeds above the speed of sound.

Speeds above the speed of sound can be reached efficiently only by high-swept wings that extend back from the fuselage in somewhat of a "V" shape.

But—again unfortunately for aeroplane

designers—the highly-swept wings cannot provide the short take-off, nor long-range low fuel usage flight that is required.

Now aircraft engineers have come up with the answer—an aeroplane that can swing its extended high-lift wings backwards in a "V" shape to enable it to reach high speeds.

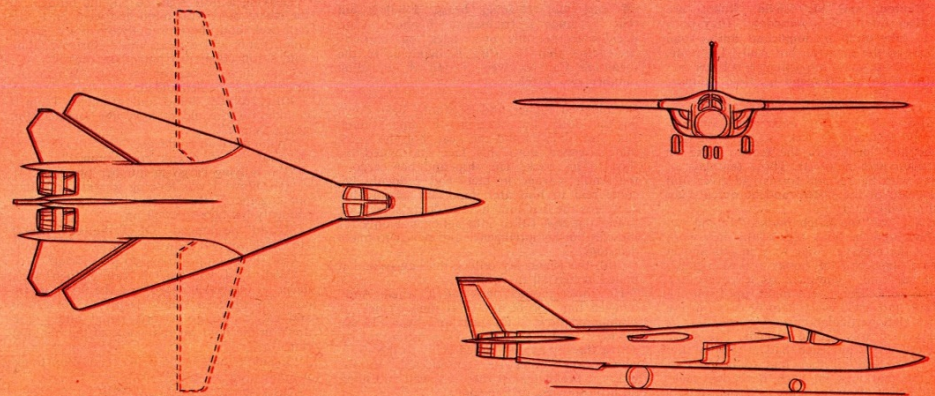
The F.111 supersonic jet fighter begins its flight with wings fully extended. As it climbs into the sky and increases speed it tucks back its wings close against the fuselage and zooms off like an arrow to its cruising speed of 1,600 m.p.h.

When the aircraft flies back to its base the

wings are swung out again, speed drops and landing is made much easier—and, more important, over a shorter distance than if the wings were still swung back.

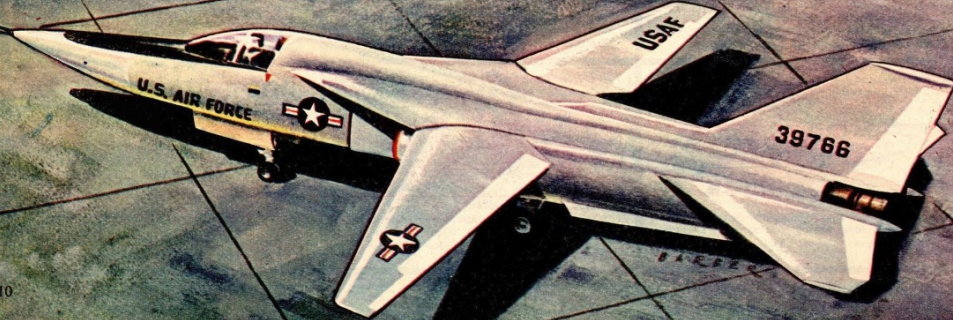
The F.111 weighs 30 tons, and many designers doubted whether a plane so heavy would be capable of moving its wings in flight. Over 18,000 hours of wind tunnel tests and countless individual tests finally persuaded them that it could be done.

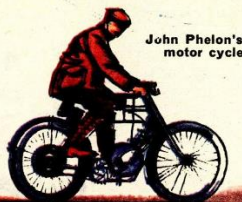
The aircraft flies with two pilots and is capable of speeds well above the speed of sound from less than 500 to more than 60,000 feet above the ground.



Calling all aircraft spotters! Here is the F.111 in plan, head-on view and side view.

The F.111 on the ground. Here you see the plane that is capable of speeds two and a half times the speed of sound at rest with its wings outstretched.





John Phelon's motor cycle



1912 Matchless



1930 Rudge



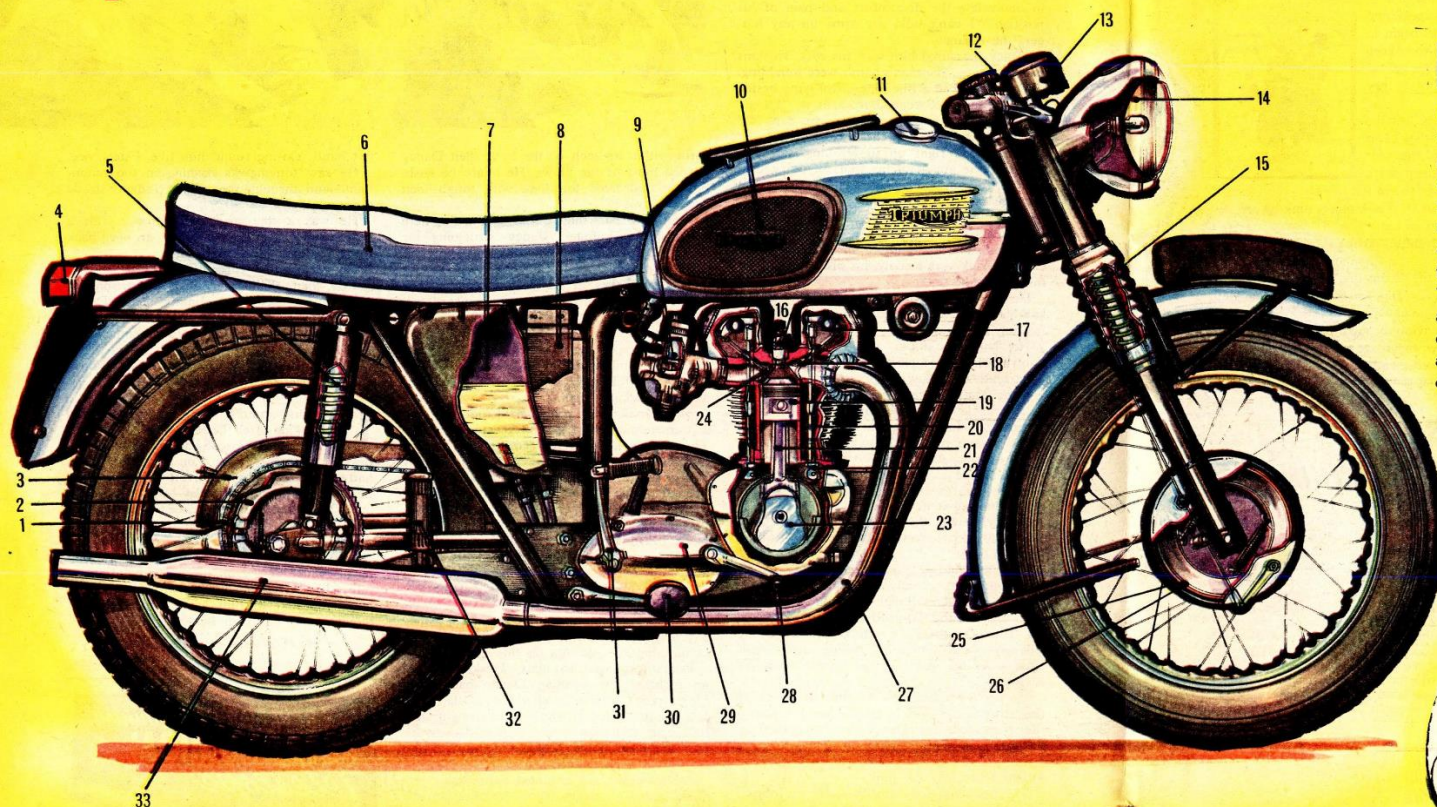
1939 Velocette



1950 Norton

LOOKING INTO THINGS

Speed on Two Wheels



THE Triumph Bonneville has a twin-cylinder 650 c.c. engine with two carburettors. This is the engine which holds the current world speed record of 224.57 m.p.h. for two-wheeled machines.

Now here is the key to the drawing above:

- 1 Chain drive.
- 2 Brake shoes. (The brake linings are rivetted onto the shoes).
- 3 Chain cover.
- 4 Rear light.
- 5 Spring and shock absorber unit.

- 6 Dual seat.
- 7 Oil tank.
- 8 Battery.
- 9 Carburettor
- 10 Knee grip on petrol tank.
- 11 Petrol tank filler cap.
- 12 Clutch lever.
- 13 Speedometer.
- 14 Front lamp.

- 15 Front hydraulic shock absorber.
- 16 Sparking plug.
- 17 Rocker.
- 18 Exhaust valve.
- 19 Piston.
- 20 Push rod.
- 21 Con rod.
- 22 Cam.
- 23 Crank.

- 24 Inlet valve.
- 25 Front brake drum.
- 26 Brake lining.
- 27 Exhaust pipe.
- 28 Gear change.
- 29 Gear case.
- 30 Foot rest.
- 31 Kick starter (folds back).
- 32 Passenger footrest.
- 33 Silencer

IN the early days of the petrol engine there were frequent arguments about whether it should be employed as a power unit for vehicles of two wheels or four. There were those who thought it more dignified to have something which was rather like a front parlour on wheels, and there were others who liked the feel of the fresh air rushing past them on the open road.

The same arguments still go on to-day, although the modern motor car has come a long way from its strange looking ancestors and the present day motor-cycle is very different from the old boneshakers of 70 years ago, as you can see from this wonderful drawing of a new Triumph Bonneville 120.



THE Italian Gilera (1957) was the first machine to lap the Isle of Man mountain course at over 100 m.p.h.

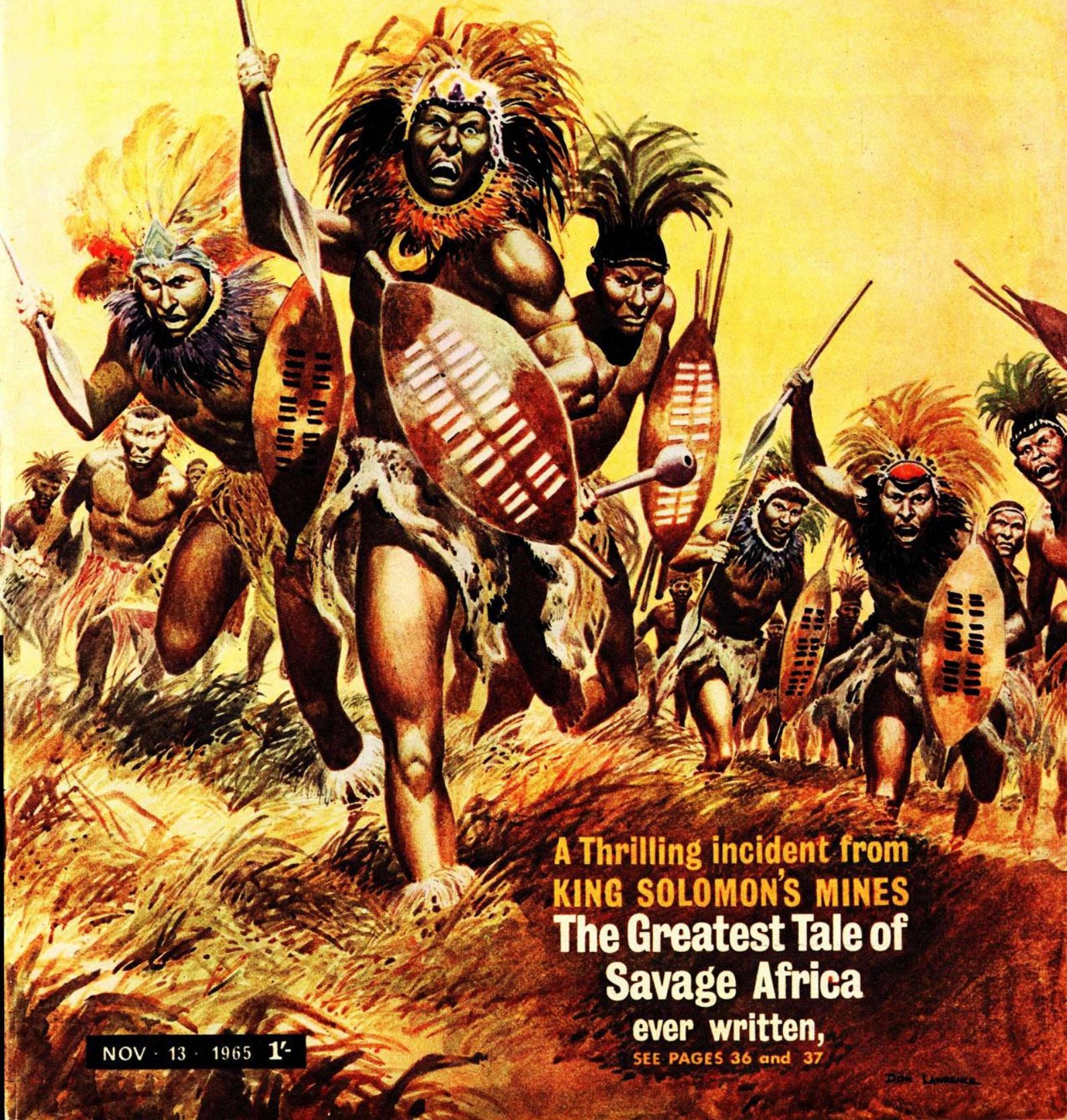


THE Honda is Japan's latest challenge to the motor-cycle racing world. Jim Redman of the Honda team rode this amazing six-cylinder, 250 c.c. machine to its third successive T.T. victory this year. During the race he broke the lightweight ton-up barrier with a speed of 100.09 m.p.h.

RANGER

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MONDAY



A Thrilling incident from
KING SOLOMON'S MINES
The Greatest Tale of
Savage Africa
ever written,

NOV · 13 · 1965 1¢

SEE PAGES 36 and 37

DON LAWRENCE

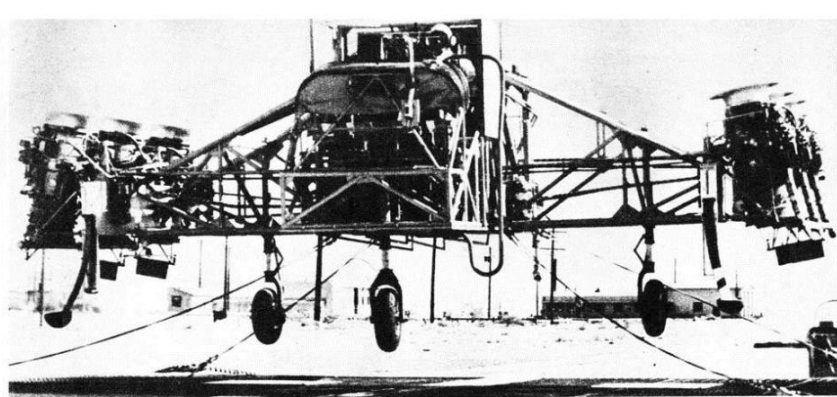


This amphibious (land or water) car is used by German police. It must be useful for taking short cuts when chasing criminals.

YOU CAN LAUGH— BUT THEY DIDN'T

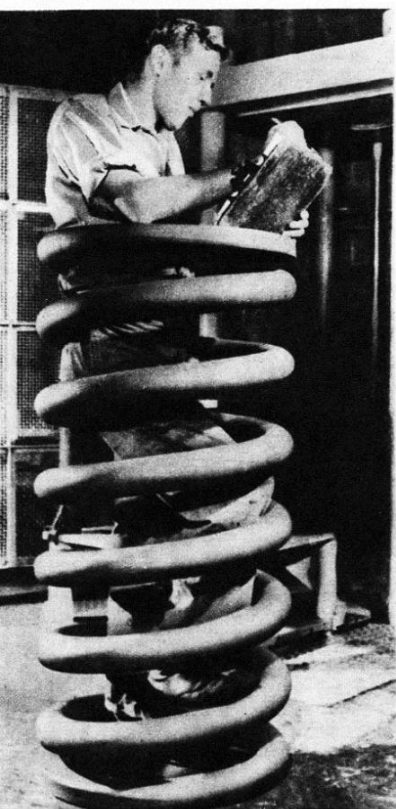
● Angler George Holland thought he would like to have a quiet day's fishing but... first he dropped his bait tin in the river. Next his car keys plopped into the water as he leaned over trying to get the tin out. Then George himself fell in when a bridge crumbled. Without his keys he couldn't get home in his car and he ended up having to hitch-hike to a garage in his wet clothes for help.

● Advertisement in a San Antonio, Texas, newspaper: "Six-foot boa constrictor. Harmless. Won't bite unless he gets a chance. Owner in bed with snake bite. Cheap!"



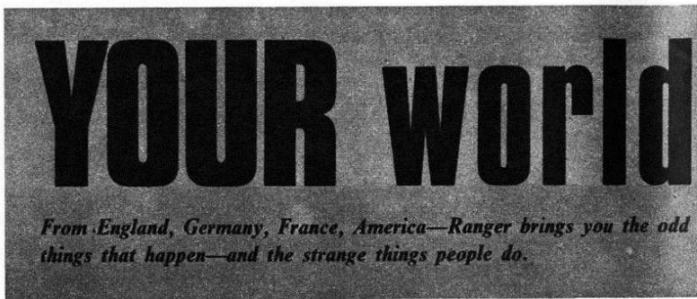
They call it the 'Flying Skeleton'. It is an experimental vertical take-off machine. The first one of these was British-made and named the 'Flying Bedstead', but this one is American and has six swivelling jet engines.

What would you call this odd-looking animal? A Zebig maybe, or a Pigra perhaps? Or is it just a plain, ordinary pig which has joined a football team? Actually the stripes are shadows from the paling fence on the right.

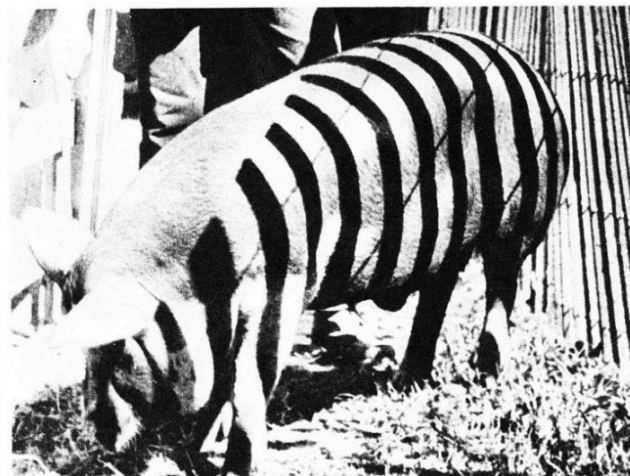
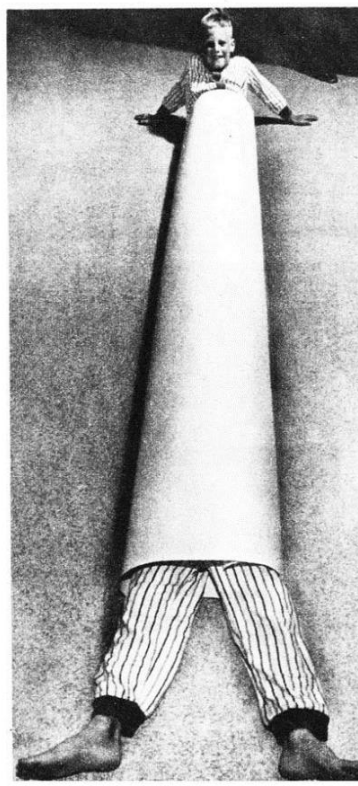
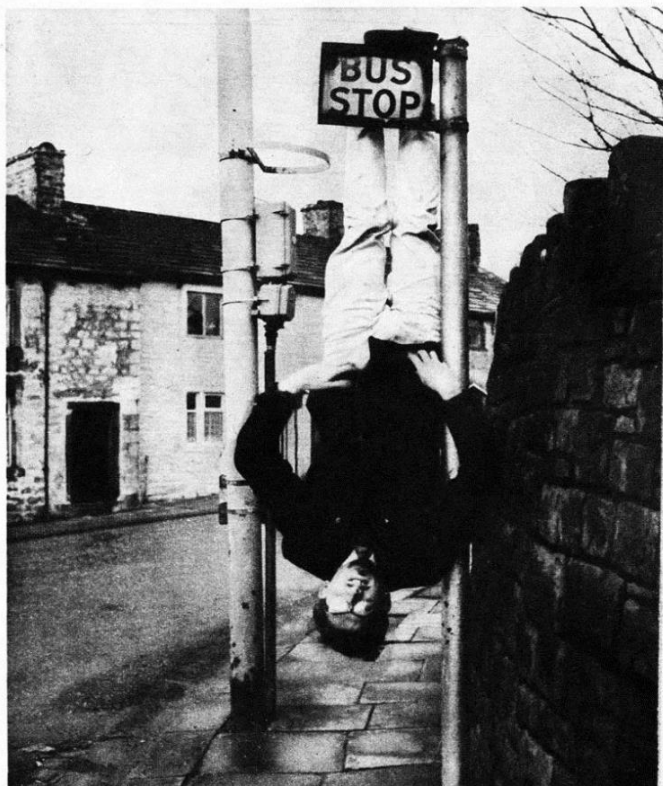


▲ A man well wrapped up in his work is this factory inspector in America. He is resting inside a giant coil spring used in the suspension systems of Atlas, Titan and Minuteman rocket missiles.

When young Terry Andrews of Barnoldswick, Yorks., has to wait for a bus he sometimes just sort of hangs around like this! Terry began hanging from his feet at home to help him relax. Now his feet are so strong he relaxes in all sorts of odd places.



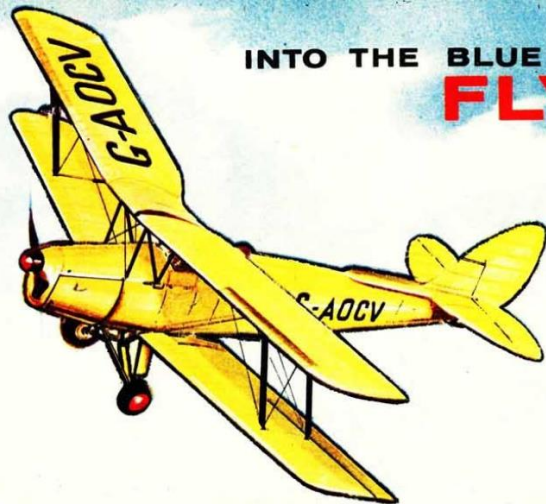
From England, Germany, France, America—Ranger brings you the odd things that happen—and the strange things people do.



Ten-year-old Mike Arms would need a long bed if that were all him inside that tube. But the feet are really those of his brother, Paul, who crawled into the other end of this roll of paper. Anyway, it gave Mum a surprise.

The people of Paris are getting used to seeing Monsieur Luciatte with his pedal car. He says it's the best way of travelling round the crowded city. When he gets stuck in a traffic jam he just picks it up and walks his way out of it.





ONE of the best known light aircraft in the world is the Tiger Moth. This little, single-engined biplane came from the famous de Havilland Company who make the Comet and Trident jet-liners. Thousands of R.A.F. pilots learned to fly in them during World War II.



THE Auster Taylorcraft is a light, high-winged monoplane often used for pleasure flights. It is powered by a de Havilland Gipsy Major engine, seats three people including the pilot and can land and take-off from quite small grass fields. It has a top speed of 145 m.p.h.



A SUPER-LUXURY aircraft used for private flying is this American Cessna 411. Apart from pleasure flying, many big industrial firms use it to fly important people on their staff around the country. It is fitted with every radio aid, has air-conditioning and carries six to eight people.

INTO THE BLUE

FLYING JUST

Two pages about aeroplanes

WHEN big jet airliners or high-flying R.A.F. fighters or bombers roar overhead, you are so used to them you probably don't even look up.

edited for you by NEVILLE DUKE, the famous test pilot.

FOR FUN

But the sight of a small, propeller-driven light aircraft will usually make people turn their heads. This week Into the Blue shows you some of these tiny machines which are such fun to fly.

HERE is a popular light aircraft built in this country. It is the Druiene Turbulent designed by a Frenchman. It costs less than many modern motor cars, and uses less than 2 gallons of petrol an hour. With a top speed of 109 m.p.h. and a landing speed of only 35 m.p.h. it is both safe and easy to fly.



THERE are over 170 private flying clubs in Great Britain. For safety reasons, their activities are strictly controlled by Air Ministry regulations. Hundreds of airliners and R.A.F. aeroplanes are constantly flying all over the country and no light aircraft pilot wants to get mixed up with them! Learning to fly is more expensive than learning to drive a car, but if you are seventeen or over and live near a flying club you may be able to join the ranks of the 9,300 young and old flyers who have passed the test which earns them a P.P.L.—Private Pilot's Licence.

COULD YOU FLY A LIGHT AEROPLANE?

THERE is a saying that good horsemen make better flyers than do good car drivers. Although this is not strictly true, of course, it is said because unlike the fairly strong hand and foot movements used in driving a car, only the gentlest of movements is required for controlling the flight of an aircraft—particularly a light aircraft which is very sensitive to

the slightest alterations in the positions of its joystick and rudder bar. Just as a violent tug on the reins of a horse will make it rear up suddenly, any violent movement of the plane's controls can have disastrous results. When a pilot wishes to make his aircraft climb he eases the joystick back and once the plane has responded, he returns it to the upright

position. The 'plane will then climb until he eases the control column forward when it will level out. If he holds the joystick back the plane will loop the loop.

Turning a plane left or right is done by means of the joystick alone. As the plane banks it will turn in the direction in which the wings dip. Only when it is at right angles to the ground is the rudder needed to keep the nose from slipping groundwards.



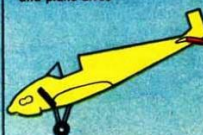
THE controls of a light aeroplane are kept as simple as possible. In the middle of the cockpit floor is the joystick (11). Under the instrument panel is the rudder bar (10), which is operated with the feet. The instruments are as follows:—

1. Turn and Bank indicator.
2. Compass.
3. Throttle.
4. Air Speed indicator.
5. Altimeter (for measuring height).
- 6, 7 & 8, are engine instruments, including revolutions counter, and oil pressure gauge.
9. Engine switches.



Joystick back, elevators up and plane will climb.

Joystick forward, elevators down and plane dives



Joystick over to left, left wing drops and plane banks left.



Joystick to right, and right wing drops as left wing rises and plane banks right.



Rudder bar pushed to the right and plane's nose moves right.



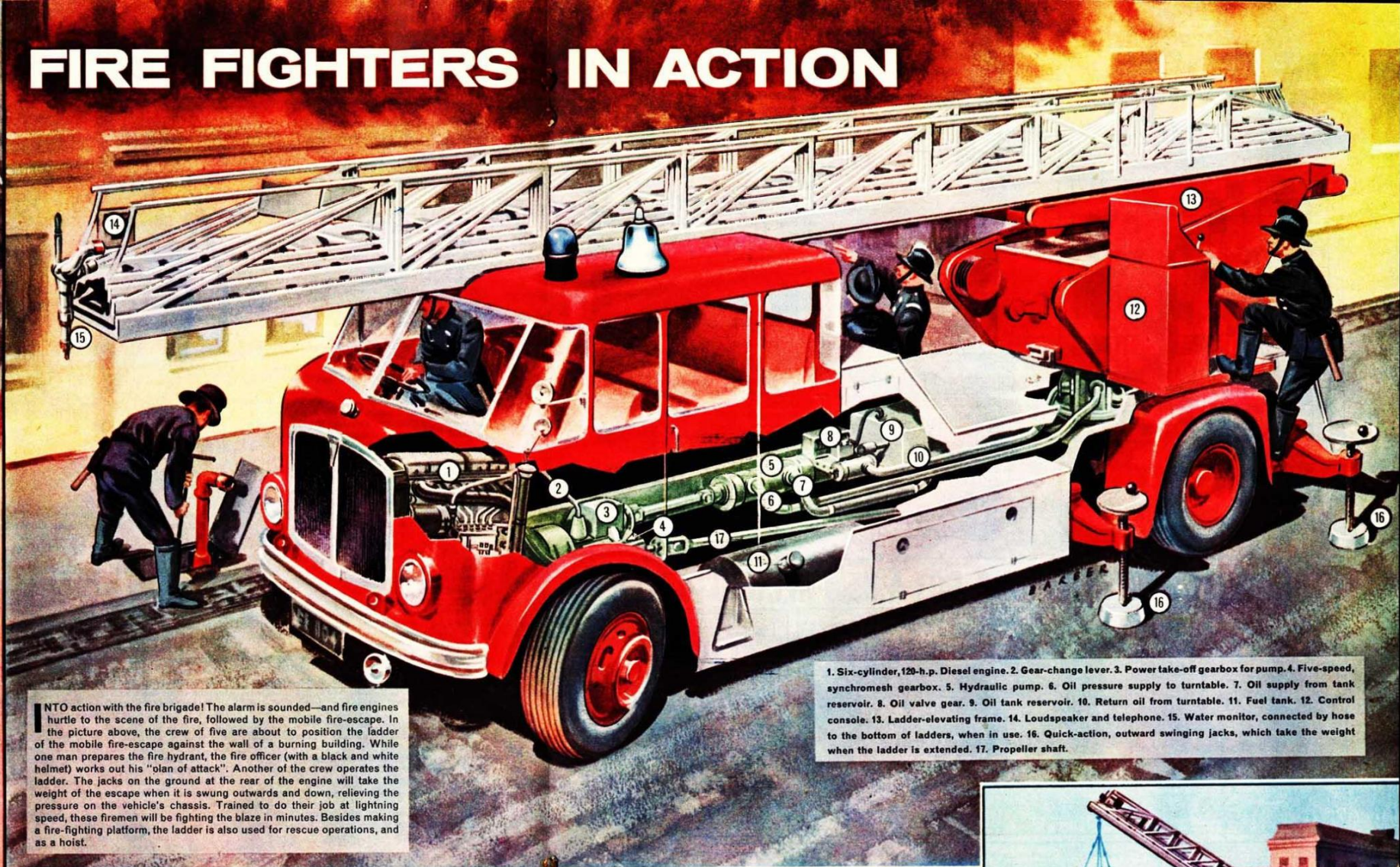
Rudder to left and plane swings to the left.



LOOKING INTO THINGS

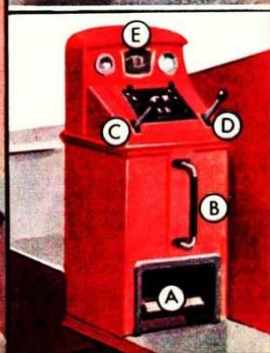
THE huge turntable ladder, when fully extended, is between 100 and 120 feet long depending upon the type of escape.

FIRE FIGHTERS IN ACTION



INTO action with the fire brigade! The alarm is sounded—and fire engines hurtle to the scene of the fire, followed by the mobile fire-escape. In the picture above, the crew of five are about to position the ladder of the mobile fire-escape against the wall of a burning building. While one man prepares the fire hydrant, the fire officer (with a black and white helmet) works out his "plan of attack". Another of the crew operates the ladder. The jacks on the ground at the rear of the engine will take the weight of the escape when it is swung outwards and down, relieving the pressure on the vehicle's chassis. Trained to do their job at lightning speed, these firemen will be fighting the blaze in minutes. Besides making a fire-fighting platform, the ladder is also used for rescue operations, and as a hoist.

1. Six-cylinder, 120-h.p. Diesel engine. 2. Gear-change lever. 3. Power take-off gearbox for pump. 4. Five-speed, synchromesh gearbox. 5. Hydraulic pump. 6. Oil pressure supply to turntable. 7. Oil supply from tank reservoir. 8. Oil valve gear. 9. Oil tank reservoir. 10. Return oil from turntable. 11. Fuel tank. 12. Control console. 13. Ladder-elevating frame. 14. Loudspeaker and telephone. 15. Water monitor, connected by hose to the bottom of ladders, when in use. 16. Quick-action, outward swinging jacks, which take the weight when the ladder is extended. 17. Propeller shaft.



CONTROL CONSOLE

THIS is what the fireman uses to operate the ladder. A. Loading pedal. The controls have no effect until this is pressed down. B. Rotating control, worked by the operator's knees. C. Elevation control. D. Extension control. E. Loudspeaker.

HIGH PLATFORM

THE platform at the top of the ladder (right) enables a fireman to fight a blaze on upper floors with ease.

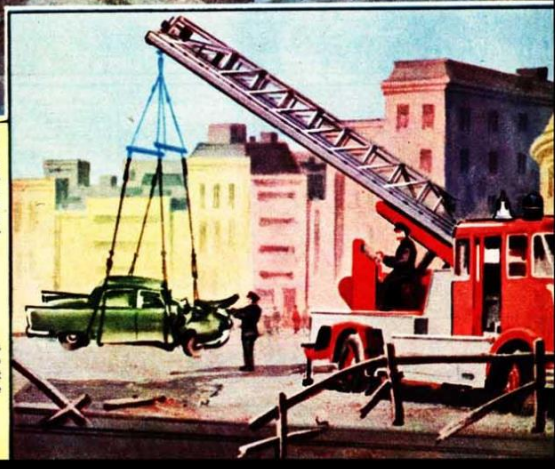


HOW THE ESCAPE IS RAISED

THE powerful hydraulic rams seen on the left elevate the long ladder, operated by a fireman sitting at the control console. Special devices protect the ladder if it strikes an obstacle while extended, and mechanical locks built into each ram keep the ladder steady even if the works are damaged.

THE HIDDEN CRANE

THE fire-escape can also be used as a powerful hoist. On the right, it is lifting up a car. The control system has devices built into it which automatically prevent the crane from lifting up too heavy a load.



RANGER

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EVERY MONDAY



RACING CAR
LEAPS FROM
THE TRACK

Amazing Pictures

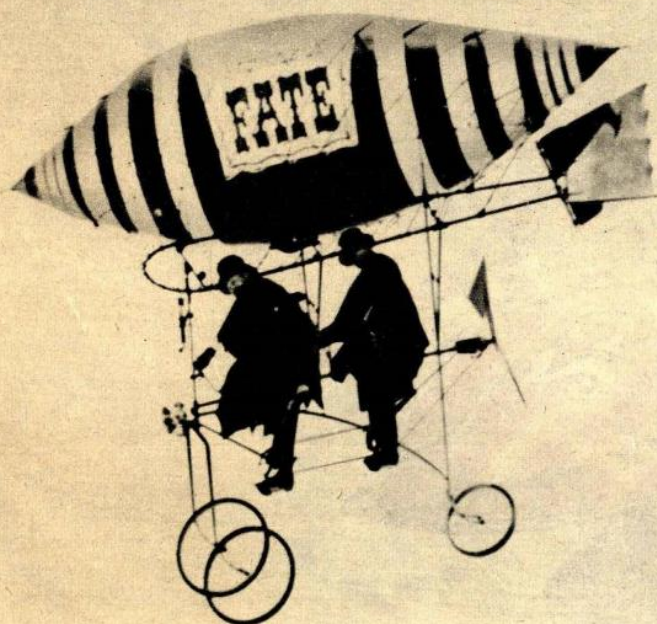
SEE PAGES 6 and 7

NOV - 20 - 1965 1¢

Excitement and adventure is all around you—if you know how to look for it. And Ranger's cameramen do know how—as you can see for yourself from these action-packed pictures.

YOUR world

Strange things happen all the time in the make-believe world of films, and people living in Hollywood, California, are pretty used to them by now. But even they were a bit shaken when they looked up one day and saw these two men calmly pedalling an odd-looking contraption over the rooftops. It's a three-wheeled tandem suspended beneath a gas-filled balloon. How they got it up there nobody knows, and all we can tell you is that it was specially made for a comedy film called "The Great Race", so it's no use asking your dad to buy you one for Christmas!

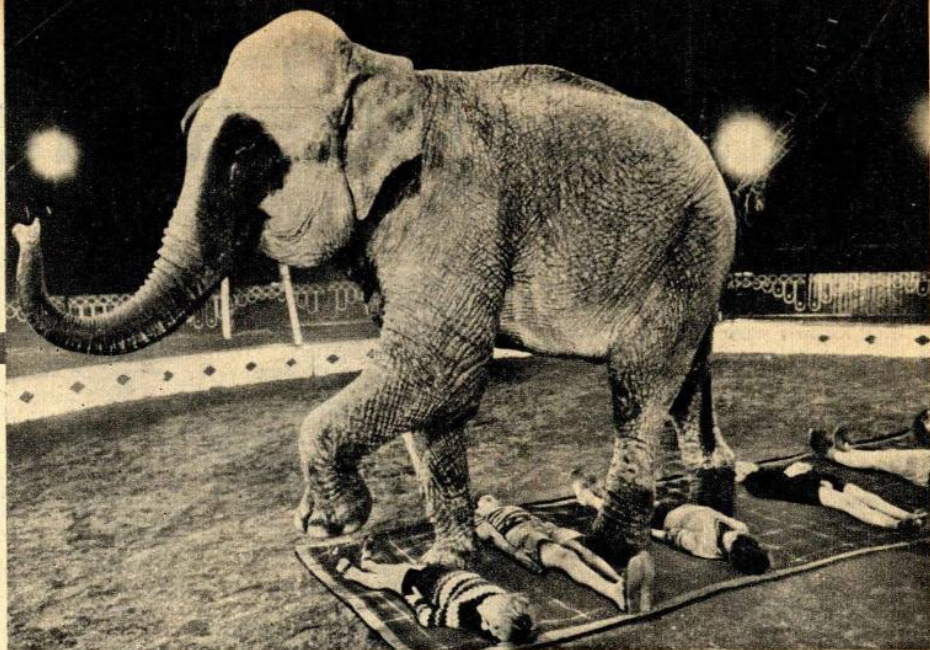


One, two, three—HUP! High above the heads of the spectators in London's Trafalgar Square jumps a member of one of the many Commonwealth Dance Troupes which have been visiting Britain. This man's name is Mamadu Mara, and he is a member of the Sierra Leone National Dance Troupe. While the drums beat out exciting African rhythms he thrills the crowd with great leaps which would be the envy of many trained athletes. Dancers from places as far apart as tiny Dominica in the Windward Isles, and Canada, came to this country to take part in a great Commonwealth Arts Festival, some of which was seen on television.



TODAY

Surf riding on the giant Pacific rollers is a sport which calls for strong nerves, as well as great skill, and here is a man with plenty of both. He is speeding towards the shore on his surfboard at between twenty and thirty miles an hour. Behind him roars a fifteen-foot wave, spray hissing from the top of it as it curls over, seeking revenge on the man who dared to ride its broad back. If he loses his balance half a ton of water will crash down, leaving him to fight his way to the surface.



Have you ever wanted to work in a circus? Well, it may be an exciting life, but it's tough too. The young people in this picture are in a training school run by Billy Smart's Circus. They are the sons and daughters of people who work in the famous sawdust ring, and they never know what they may be asked to do. Trapeze, juggling, wire-walking, or just lying down while an elephant steps carefully between them!

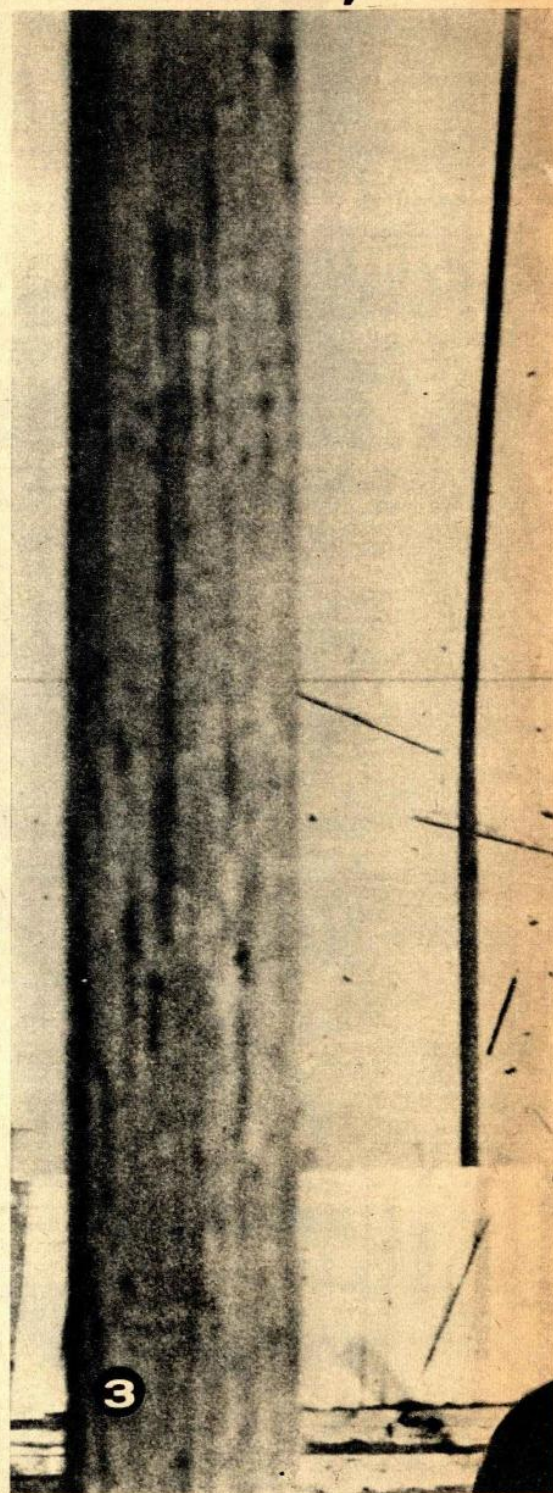
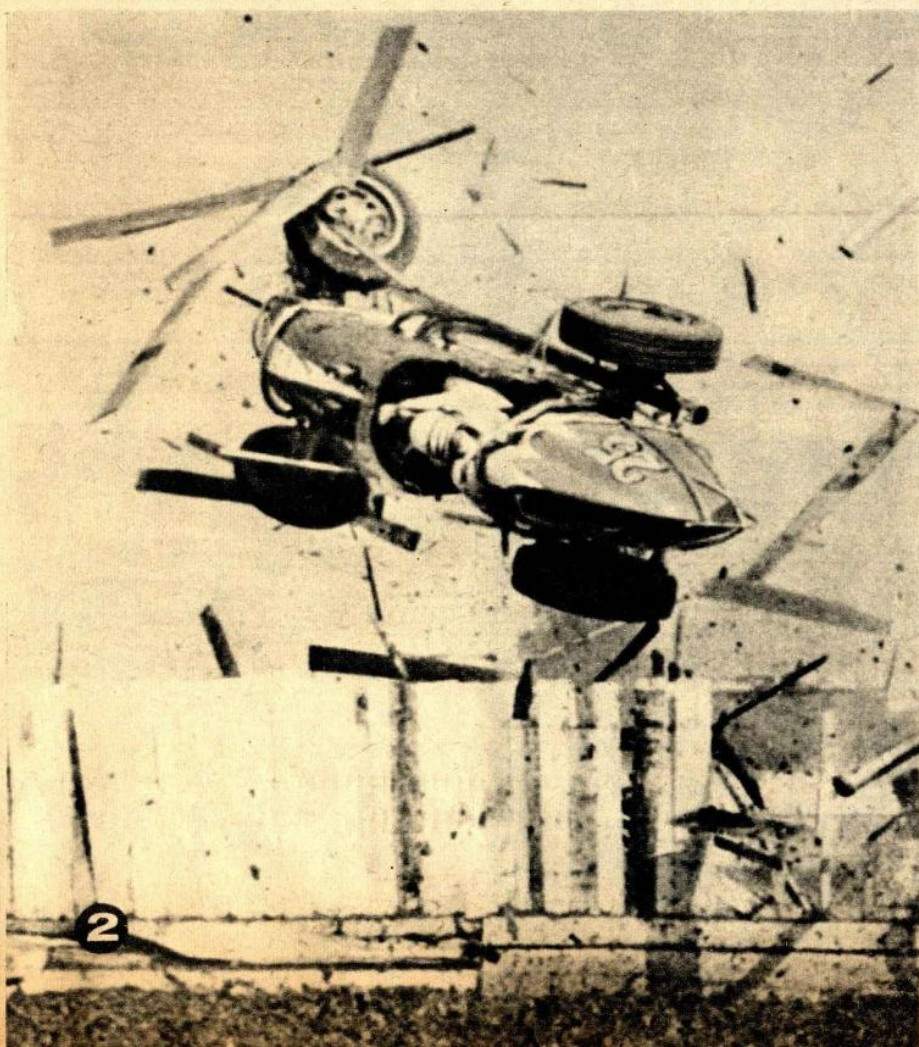
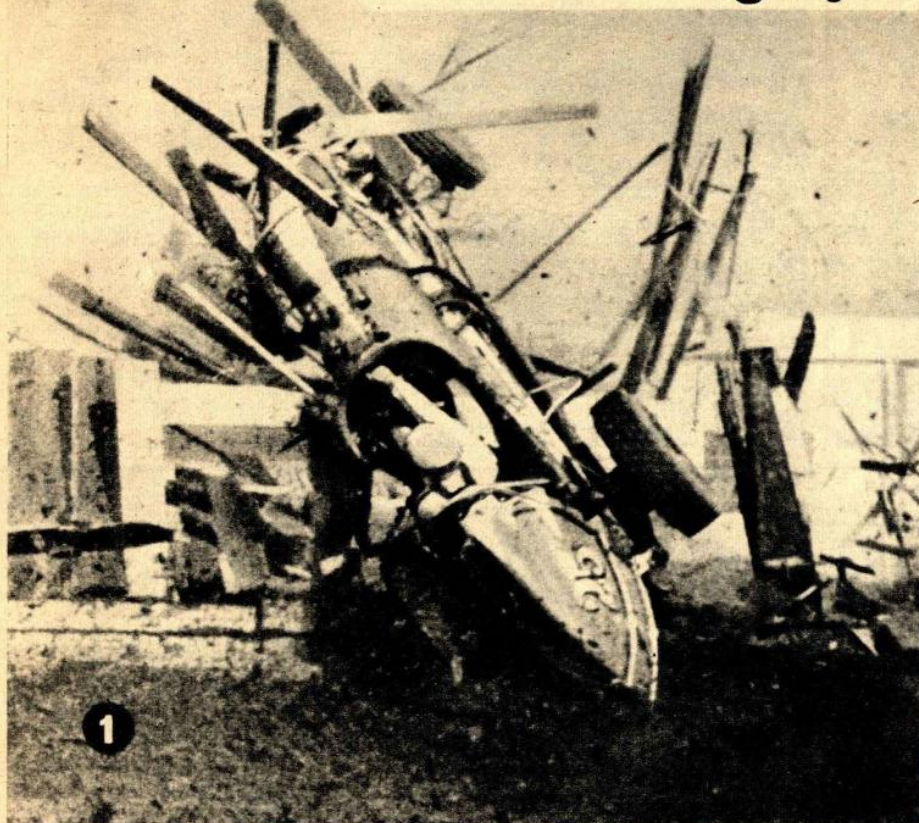
YOU MAY NOT BELIEVE IT, BUT IT'S TRUE

Fred, a baby swallow got left behind by his parents in the eaves of a house in Bristol. Like all swallows they had left on their yearly migration to the warmer shores of North Africa. Fred was far too young to fly the 1,700 miles on his own, so officials of the R.S.P.C.A. looked after him. Now he has been put in a cage, flown out by British European Airways jetliner and arrived in Morocco before his mum and dad!

Gardeners working on a new civic centre in Rochester, New York, spent hours sowing grass seed for a new lawn. They got a shock when it began to sprout thousands of green onions! The top soil, which had been brought from elsewhere for the lawn, had already been sown with onion seed.



***RANGER* brings you the action-packed**



RACING

These amazing split-second pictures were taken by a quick-thinking photographer on West Sacramento's Capital Speedway in California. Stationed on one of the corners he watched the cars roaring towards him. One of them was coming into the turn too fast!

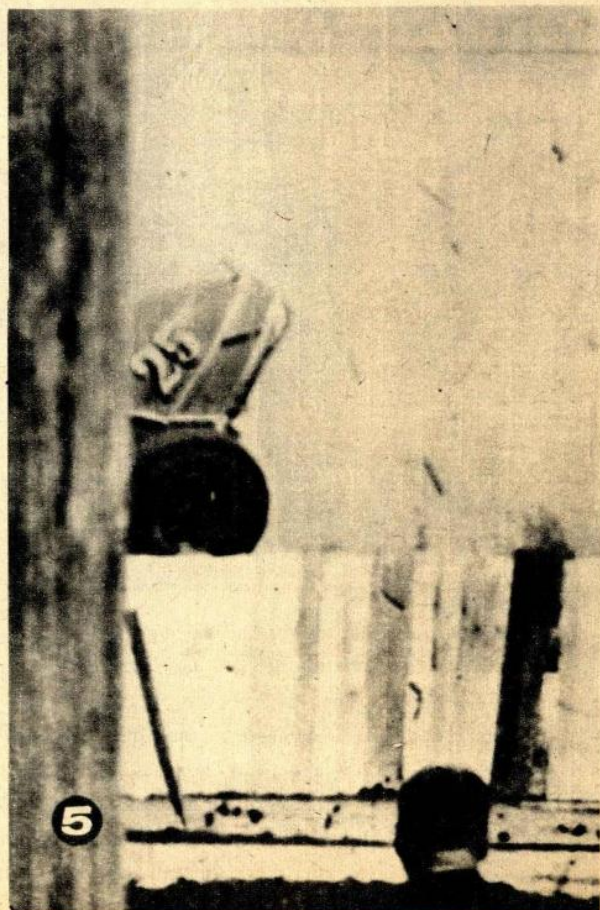
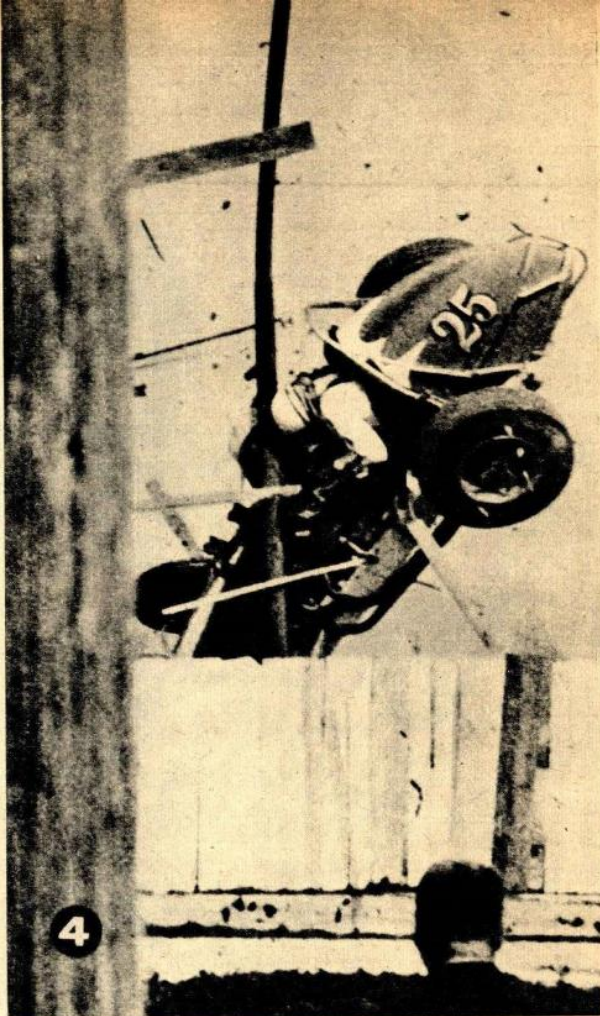
pictures of thrilling events!



CAR TAKES-OFF!

The driver, David 'Red' Ryder in an Indianapolis-type car, braked, but he was too late and when you are travelling at over 100 m.p.h. things happen fast. His car began to slide towards the low guard rail. There was an ear-splitting crash and the car up-ended (Picture 1).

Still moving at the speed of a projectile, it smashed through the track's ten-foot high board fence (2), bounced into the air (3) and then nose-dived into the ground outside the track (4 and 5). It all happened so fast that the spectator didn't even have time to turn his head.



INTO THE BLUE

HOW "EARLY BIRD" BRINGS US THE NEWS

Ace test pilot NEVILLE DUKE reports on a newcomer in space

ON April 6th this year, a rocket was fired into space from America. In its nose-cone was a complicated piece of electronic apparatus which looked like a giant-sized top. It was what is known as a communications satellite, and was called Early Bird.

Travelling in the same direction as the earth rotates and moving at a speed of about 7,000 m.p.h. it now remains floating in space above the same spot on the

earth's surface. It is, in fact, 22,300 miles above the Atlantic Ocean at the Equator and is used to pick up and re-transmit radio signals which are beamed to it from either America or Britain. These signals can be either normal telephone conversations or used for sending television pictures, so that as you watch the screen in your home you can see events happening thousands of miles away in the United States.

Now here is the key to the numbers on the drawing:

1. New York.
2. Landline carrying signals to transmitter at Andover, U.S.A.
3. Saucer-shaped reflector of transmitter aerial.
4. Receiving aerial on satellite.
5. Communications aerial.
6. Goonhilly Downs receiving station in Cornwall.
7. Landline carrying signals to London.
8. London.
9. Outer surface of Early Bird covered with 6,000 solar cells for generating power.
10. Rocket motor for adjusting position of satellite while in orbit.
11. Telemetry aerials.

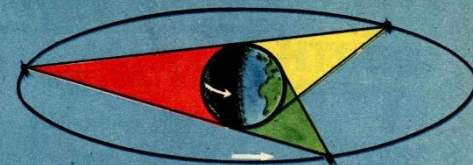


Diagram showing how three satellites rotating in the same direction and at the same speed as the earth could 'see' practically the whole of its surface.



American television cameras take pictures of a gay carnival scene in Florida. Both sound and vision travel by cable to the transmitter. (See fig. 3 on the big drawing.)



A split second after the American TV cameras have recorded the scene in Florida, people sitting round their television receivers in London see and hear the same scene.

LOOKING INTO THINGS

word is true!

Crossing the sea on a floating cushion

BRITISH brains and know-how have brought a new kind of transport to the world—the hovercraft, a vessel which is half aircraft and half ship and can travel across land or water on a cushion of air.

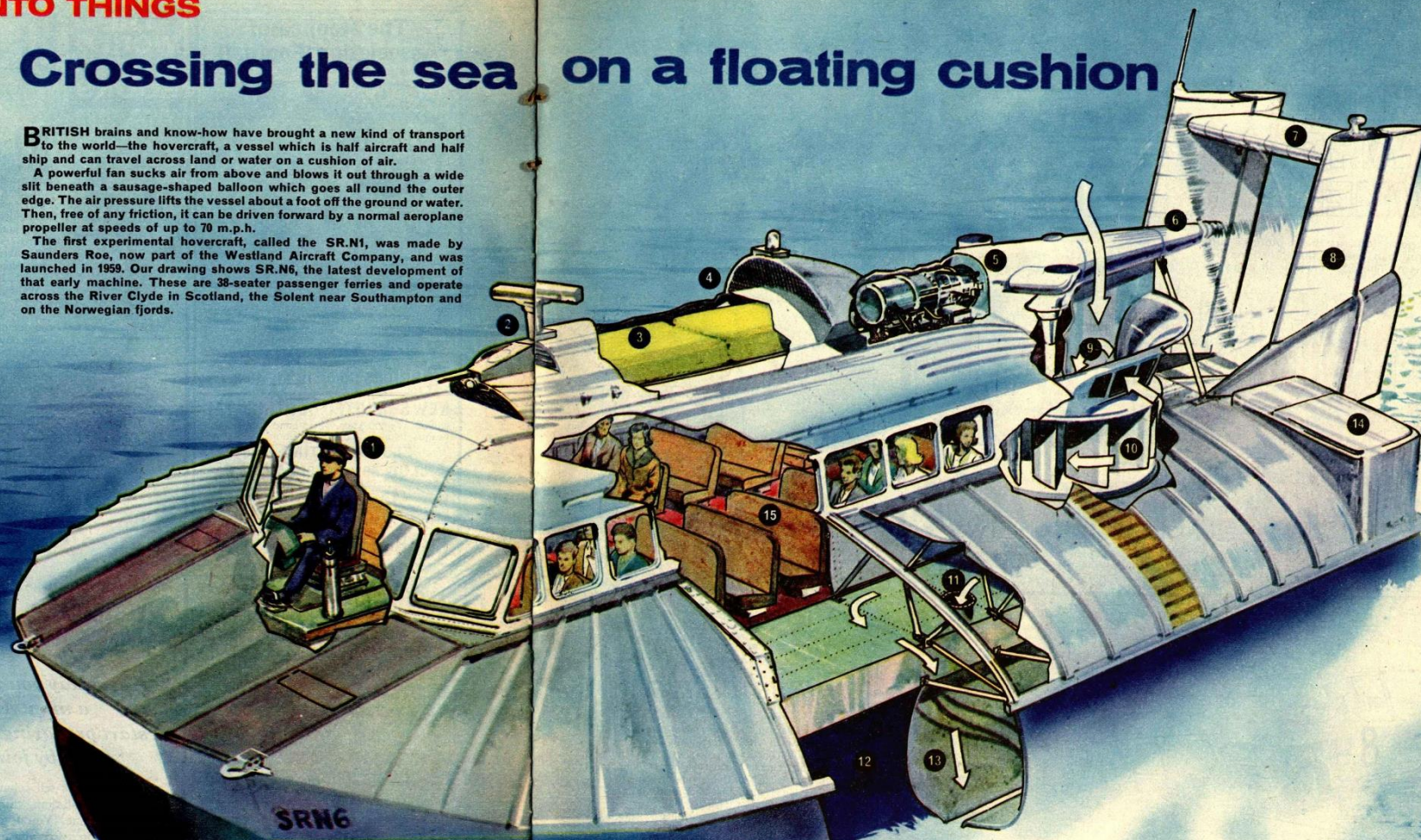
A powerful fan sucks air from above and blows it out through a wide slit beneath a sausage-shaped balloon which goes all round the outer edge. The air pressure lifts the vessel about a foot off the ground or water. Then, free of any friction, it can be driven forward by a normal aeroplane propeller at speeds of up to 70 m.p.h.

The first experimental hovercraft, called the SR.N1, was made by Saunders Roe, now part of the Westland Aircraft Company, and was launched in 1959. Our drawing shows SR.N6, the latest development of that early machine. These are 38-seater passenger ferries and operate across the River Clyde in Scotland, the Solent near Southampton and on the Norwegian fjords.

ONE great advantage which hovercraft have over other sea-going vessels is that they can run ashore on their cushion of air, let down gently and discharge their passengers. No special landing jetty or harbour is needed so long as there is a gently shelving beach.

THE man in control of a hovercraft has to have the qualifications of both an air pilot and a sea captain. As it floats on its air cushion it responds to its controls very much in the way as an aircraft does, yet at the same time it travels over water and must be navigated like a ship. In the picture above the pilot has his left hand on the air-cushion control. He changes the direction of the craft by means of a rudder which he operates with his feet. Two other hand levers which are on the other side of the pilot control the elevation and forward speed. The engines drive a normal aeroplane propeller which drives the hovercraft forward, and also a huge fan which sucks air in and blows it out underneath.

THE picture below shows the cabin interior. A complete row of seats can be folded away to make more floor space.



Here is the key to the big drawing, a part of which has been cut away to show how the air-cushion works.

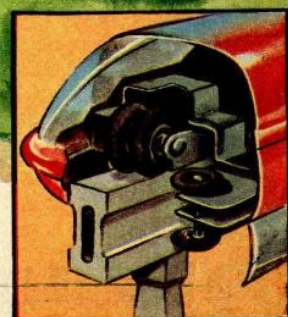
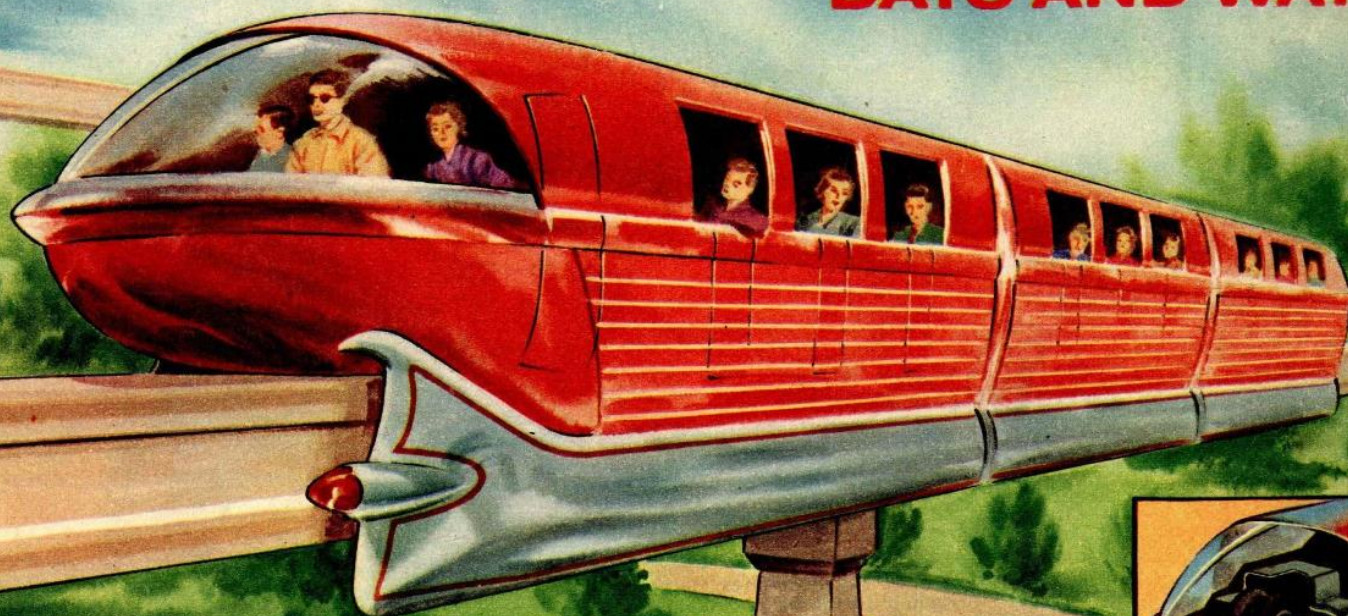
1. Pilot's control compartment.
2. Radar scanner.
3. Inflatable life rafts.
4. Engine air intake protected by metal safety mesh.
5. Bristol Siddeley Marine Gnome engine.
6. 9 ft. diameter Dowty-Rotol reversing propeller.
7. Elevator.
8. Rudder.
9. Main air intake. Air is drawn in through the vents at the top and side and down into the fan.
10. 7 ft. diameter centrifugal fan.
11. Air-cushion feed between main hull and deck.
12. Air-cushion.
13. Air skirt swelled into position by air pressure.
14. Fuel/ballast tank aft.
15. Seating for 38 passengers.

Much larger hovercraft are now being built for crossing the English Channel. These will carry 600 passengers or 30 cars and 230 passengers.

All five settlers were set fire to the farmhouse ascending to the serene signal for a wholesale

Stage and TV personality **DAVID NIXON** writes for **RANGER** every week

RAILWAY DAYS AND WAYS



The Brennan mono railcar.



Above: a railway that I've always wanted to ride in. It's the famous Alweg mono-railway in Disneyland, U.S.A.

Right: A closer view of the wheels on which the Alweg trains travel. Very much like motor car wheels, they run along a hollow concrete girder.

THE MAGIC OF MONO-RAILWAYS

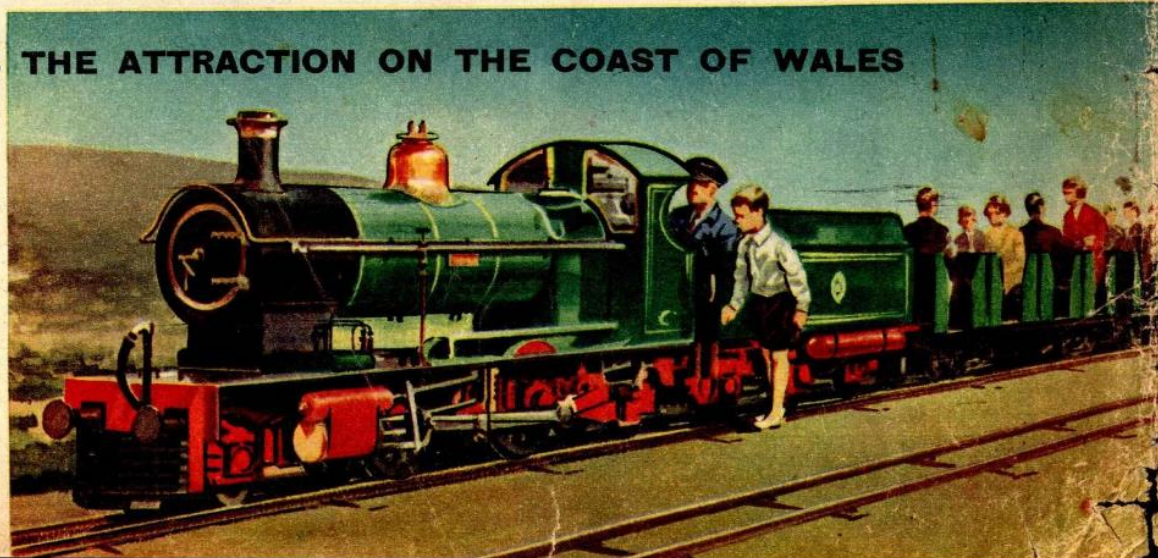
THE idea of the mono-railway—a train which runs on a single rail—has fascinated railway engineers since the end of the last century, but very few of them have been built. The Alweg mono-railway in Disneyland is one of the best known. A two-thirds scale working model, it was built to prove that the idea can work.

The three-car train carries 246 passengers. The cars are made of aluminium, plastic and steel, and run along a huge concrete girder, which they straddle like a horseman sitting in the saddle. They are driven by electricity picked up from bars running along the concrete girder.

The Alweg mono-railway is a recent development, but as far back as 1903 an Australian inventor named Brennan designed a mono-rail car which ran on an ordinary single railway line, balanced by gyroscopes. This car, which you see on the left, was powered by twin petrol engines. It was not shown to the public until 1910, when it ran on a test track at Gillingham in Kent. It was 40 feet long and could travel at 22 m.p.h.

STEAM IS THE ATTRACTION ON THE COAST OF WALES

This beautiful little engine ▶ is the 2-4-2 "Sian", which was built in 1963 for the 15-inch gauge Fairbourne Railway in Wales, which runs along the beach from Barmouth Ferry to Fairbourne. The designers took good care to make sure that "Sian" had special protection from the fine sand which blows in from the estuary shore, and it is very much like its big brothers that run across deserts all over the world.



RANGER

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EVERY MONDAY



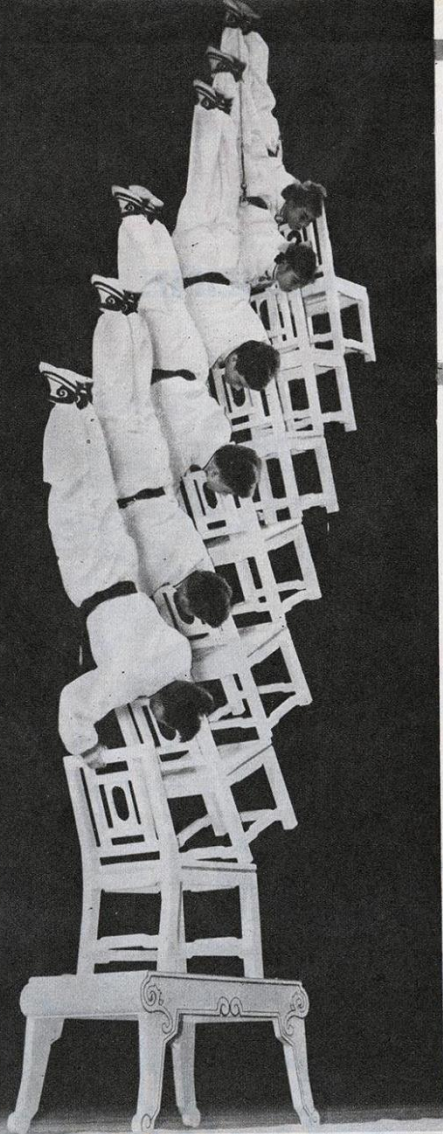
THE NEW
SPORT
OF
KINGS

See pages 6 and 7

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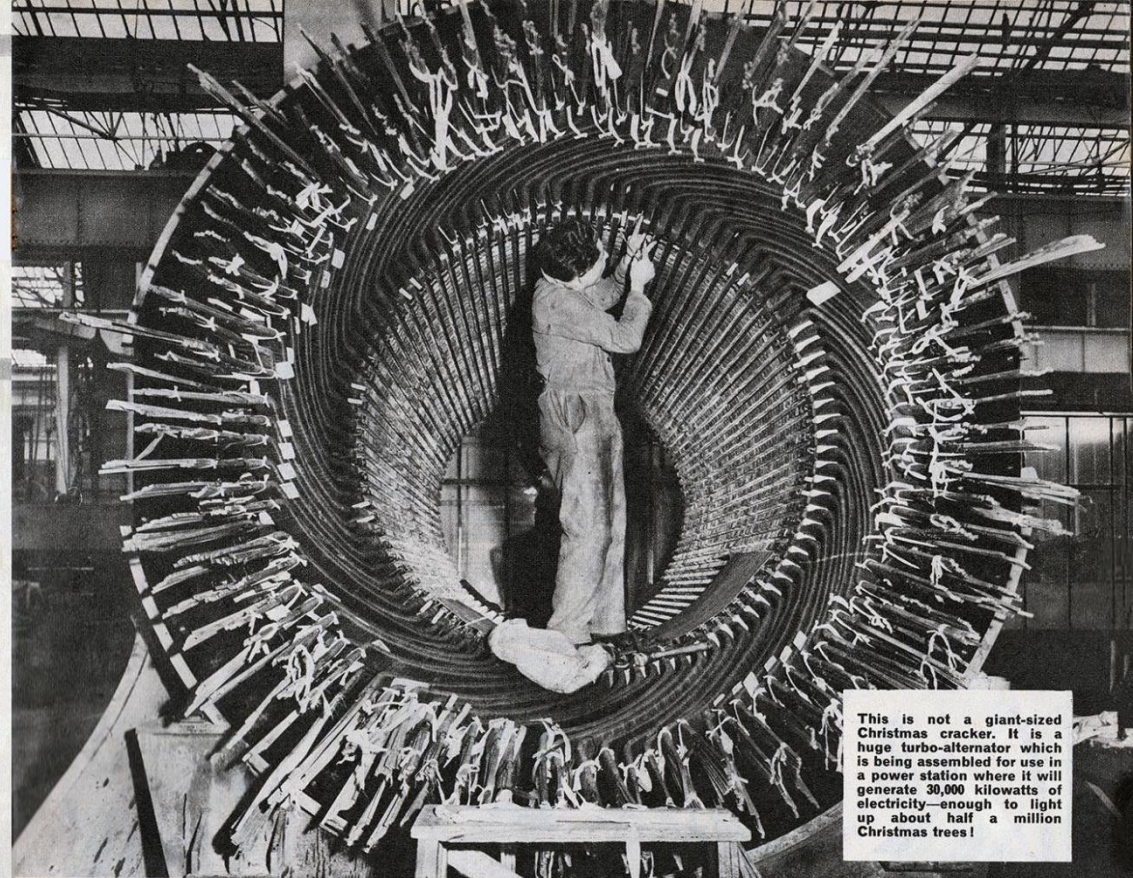
YOUR world TODAY

*Amazing things, amusing things,
unbelievable things — they're happening
all the time in Your World Today!*



▲ It looks an impossible balancing feat, but the six members of this Chinese acrobatic team, seen here rehearsing their act, do this every evening at the Palais de Chaillot Theatre in Paris.

When Jim Meads of Hatfield, Herts, went out to take some pictures of his children against the background of the de Havilland Aircraft Company's airfield, he little realized he would capture this life-or-death moment for the test pilot of a Lightning jet fighter. He glanced up to see the fighter screaming earthwards in what must be a fatal nose-dive. When it was barely 150 feet from destruction, test pilot George Aird fired his ejector seat and Jim Meads clicked his camera to capture this remarkable photograph. The plane struck the ground and exploded like a bomb, but the pilot's life was saved.



This is not a giant-sized Christmas cracker. It is a huge turbo-alternator which is being assembled for use in a power station where it will generate 30,000 kilowatts of electricity—enough to light up about half a million Christmas trees!

YOU CAN LAUGH — BUT IT'S TRUE!

Sheriff Doug Willis was suspicious of some tubes of hair cream which arrived for two prisoners at Ocala Jail, Florida. They felt heavy and he couldn't bend them—so he opened them and found hack-saw blades inside!

* * *

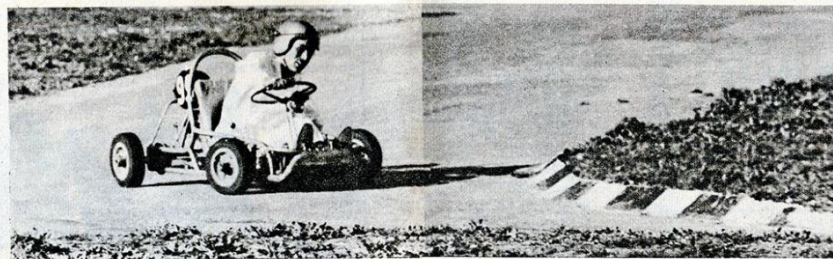
The Army is advertising for men to join a Bomb Disposal unit at Horsham, Sussex. Their job is to dig holes around any unexploded bombs which may be found. A spokesman said: "No experience is necessary. They just have to be careful."

* * *

Thieves broke into a showroom in Torquay, Devon, where the police had organized an exhibition the theme of which was 'Crime does not pay'. And it did not pay—because all they got away with was three shillings!



Motorists in Didsbury, Manchester, got a shock when they saw this hairy arm come out of a car window. In fact it was nightclub artist Michel Legrand wearing a gorilla skin which he uses in his act at the club.



THE NEW *SPORT* OF *KINGS*



All sorts of problems beset the young King Hussein of Jordan. But Hussein is a fearless monarch who, time and again, during the eleven years he has worn his uneasy crown has averted disasters to his Arab nation.

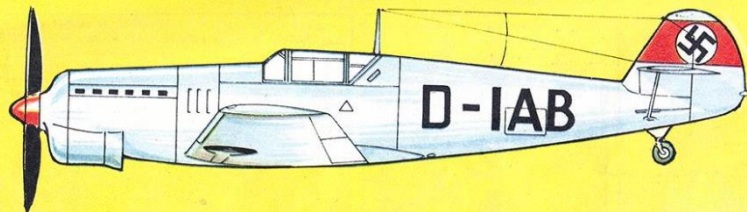
Now Hussein, who has successfully steered his country through the tortuous paths of Arab politics, relaxes by whizzing round the go-kart track at Amman airport, in Jordan's capital city.

All around the outside of the airfield guards stand fingering their machine guns ready for trouble, for the King's life has been threatened by assassins. But all Hussein's energy and enthusiasm is bent on skilfully cornering in go-kart 99 and exchanging ideas with the track mechanics.

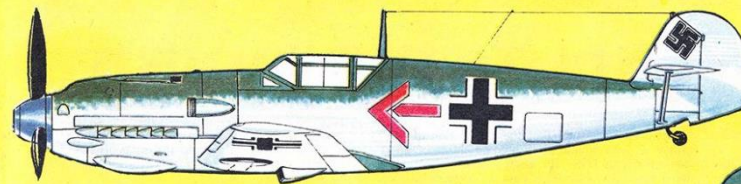
Go-karting is a popular sport in Britain, too. The thrill of speed is obtained by the lowness of the driver's position—you can see in these pictures that he is only inches above the ground. This fact helps to make a speed of 30 m.p.h. seem twice as much to the driver.

If you think it looks fun, then you are right. It is, after all, the new sport of kings!





The very first of a long line... this silver Messerschmitt (known as the Bf 109 V1) was the prototype of the fighter which later helped the German air force to gain amazing victories in the skies over Europe. This aircraft was actually powered by a British Rolls-Royce Kestrel engine!



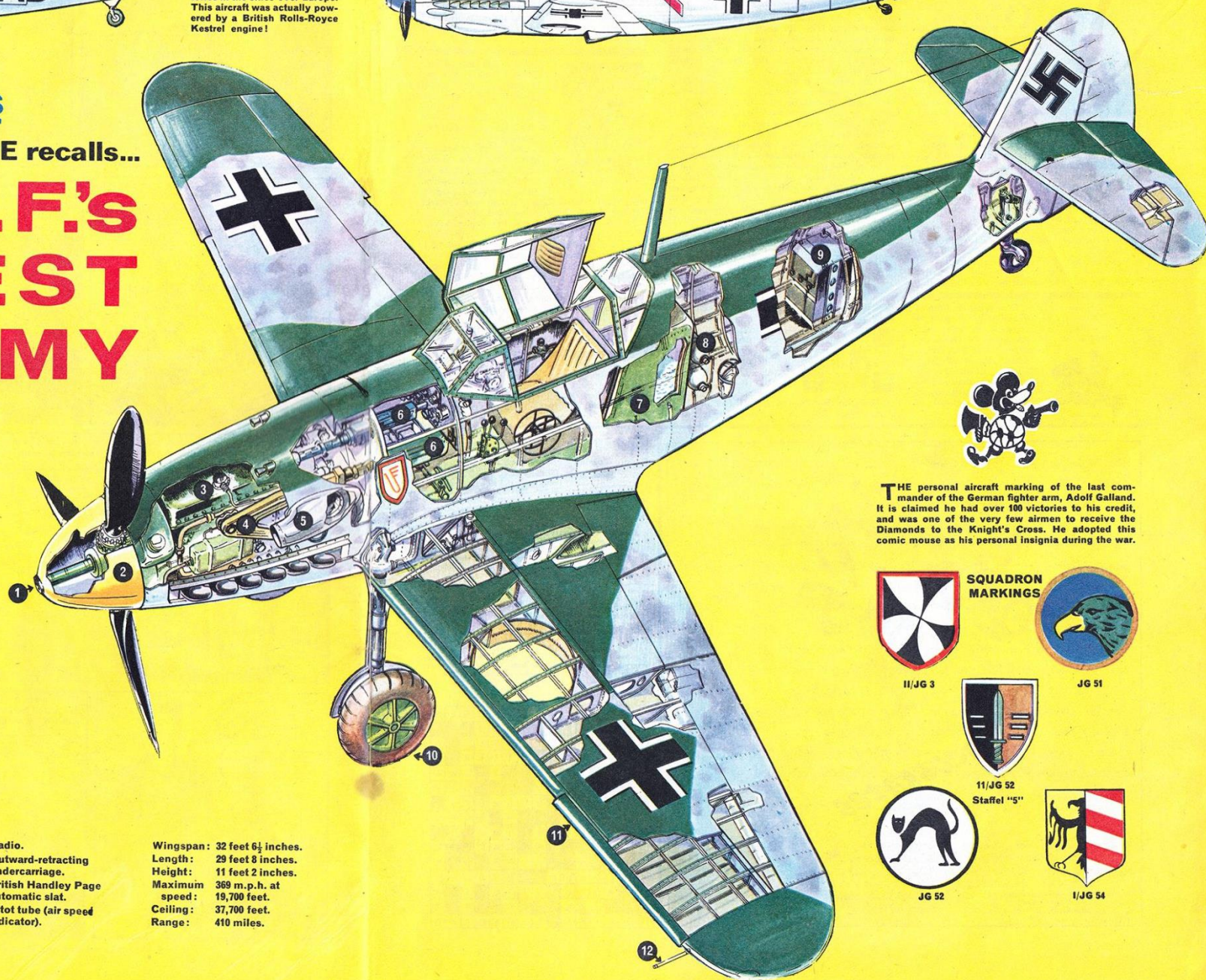
An Me (BF) 109 E—one of the fighters which took part in the Battle of Britain. This one bears the insignia of a Gruppe-Commander (roughly equivalent to an R.A.F. Wing-Commander). The 109 E was inferior to the Spitfire.

LOOKING INTO THINGS

Ace Test Pilot NEVILLE DUKE recalls...

THE R.A.F.'s GREATEST ENEMY

THE Messerschmitt Me 109 was the most important fighter the Germans ever produced during World War II. It was a 'plane which served on every front throughout the war—and more than 33,000 of these tough, dependable machines were produced between 1936 and 1945. All the great German air aces flew them. Such famous pilots as Galland and Moelders won their laurels flying what was called Germany's "wonder-fighter". A wonder-fighter the Me 109 might have been—but it was eventually beaten by the Spitfire. Even so, production of the 109 was continued right up to the end of World War II. When the German armies streamed across Poland in September, 1939, squadrons of Messerschmitt 109s zoomed into action against the out-dated Polish Air Force. The 109, although a relatively new aircraft (it had been in production three years), had the advantage of having already been tested in war. The very first operational 109s were used in the Spanish Civil War, which began in 1936, and it was here that they proved themselves outstanding fighters. Our diagram shows one of the later marks of 109, the Messerschmitt Me 109 F1, which flew on the Russian front. It bears the squadron marking¹ of JG 3.



1. 20mm. cannon firing through the centre of the propeller.
2. Variable-pitch propeller in streamlined spinner, rotating round the motor cannon.
3. Inverted D.B. (Daimler Benz) 601 N engine, 1200 h.p.

4. Engine mount.
5. Supercharger air inlet.
6. Two 7.7mm. machine guns, synchronised to fire through the propeller.
7. 88 gallon fuel tank.
8. Oxygen tanks.

9. Radio.
10. Outward-retracting undercarriage.
11. British Handley Page automatic slat.
12. Pitot tube (air speed indicator).

Wingspan: 32 feet 6½ inches.
Length: 29 feet 8 inches.
Height: 11 feet 2 inches.
Maximum speed: 369 m.p.h. at 19,700 feet.
Ceiling: 37,700 feet.
Range: 410 miles.



THE personal aircraft marking of the last commander of the German fighter arm, Adolf Galland. It is claimed he had over 100 victories to his credit, and was one of the very few airmen to receive the Diamonds to the Knight's Cross. He adopted this comic mouse as his personal insignia during the war.



11/JG 3



11/JG 52
Staffel "5"



JG 52



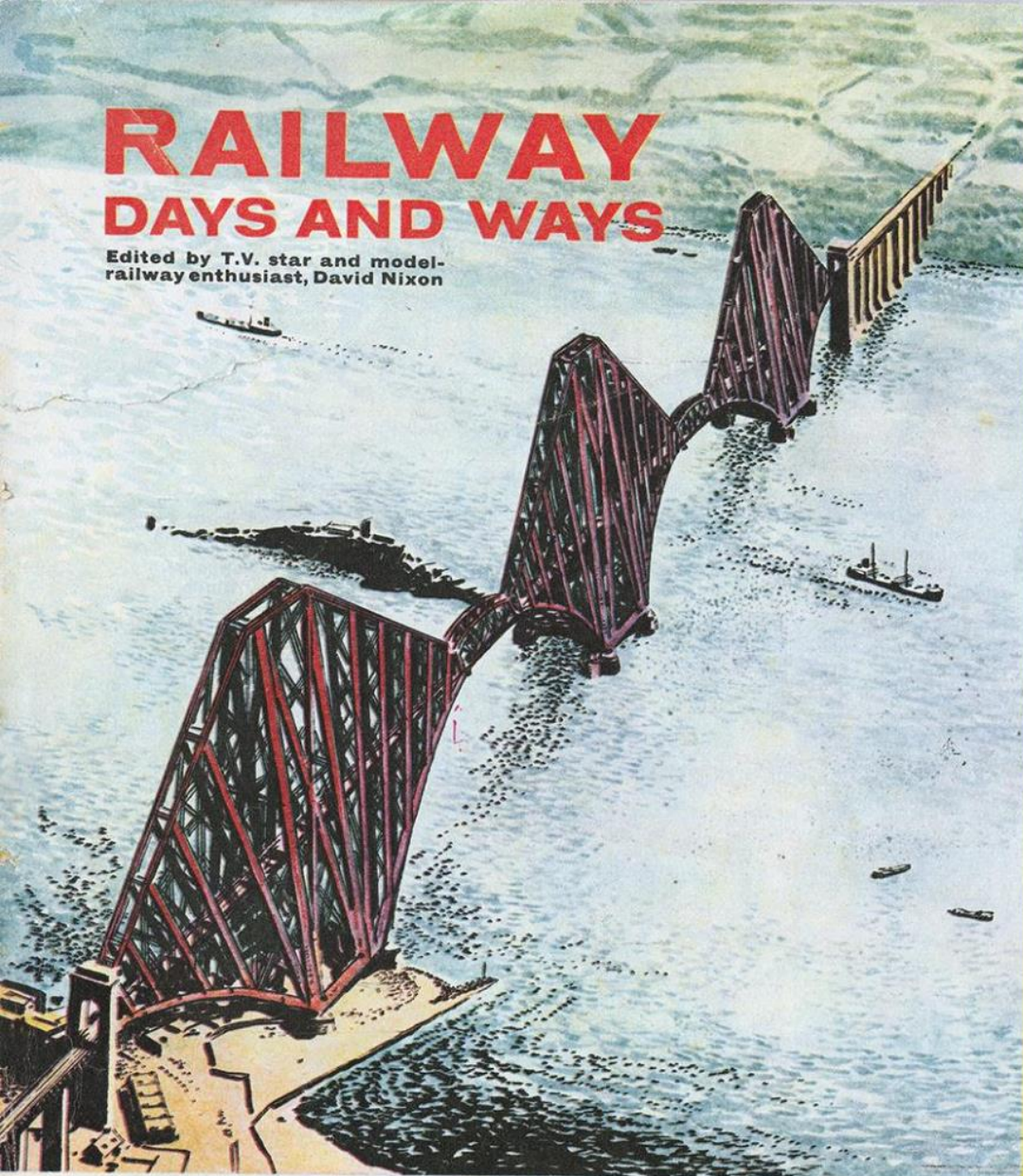
JG 51



1/JG 54

RAILWAY DAYS AND WAYS

Edited by T.V. star and model-railway enthusiast, David Nixon



A painter at work high up among the lattice girders of the Forth Bridge.

THE Forth Bridge is one of the most famous railway bridges in the world, and I have always admired it as a great engineering feat of the 19th century. It reaches the grand old age of 75 this year and I thought you would be interested to hear something about it. Incidentally, before it was built, the railway from Edinburgh to Perth or Aberdeen had to make a long detour inland to where the Firth of Forth was narrow enough for a short bridge.

The Forth Bridge was the first cantilever bridge in Britain (a cantilever is a system of building by which two arms stretch out

from a central support and balance each other).

Including its approaches it is nearly one and a half miles long and the central cantilever is 260 feet above the water. It cost £2,500,000 to build and was opened by the Prince of Wales (later King Edward VII) in March, 1890. Since then men have been working continuously keeping it in good condition, and today 29 painters work full time painting it. Work goes on all the year round and it takes 51 tons of paint to cover it—enough to decorate a small town of houses—if you wanted them all bright red!

THE 'WESTERN' CLASS

FROM the time of Daniel Gooch, an outstanding Chief Mechanical Engineer, the Great Western has been justly proud of the fine locomotives it has built at Swindon. When diesels began to replace steam, Western Region of British Railways, as it now is, decided to build a class of locomotive to fulfil the needs of the region. The result was the easily recognized class of CO-CO diesels named the 'Western' class. Our artist has drawn one of these below for you—the Western Thunderer.

WESTERN THUNDERER — THE DIESEL FROM SWINDON



RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY



**SHARK
HUNT!**

Amazing
real life
photos inside

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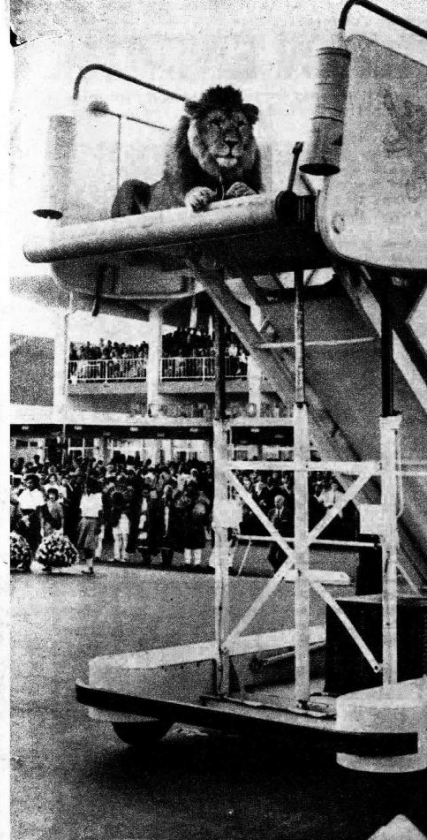
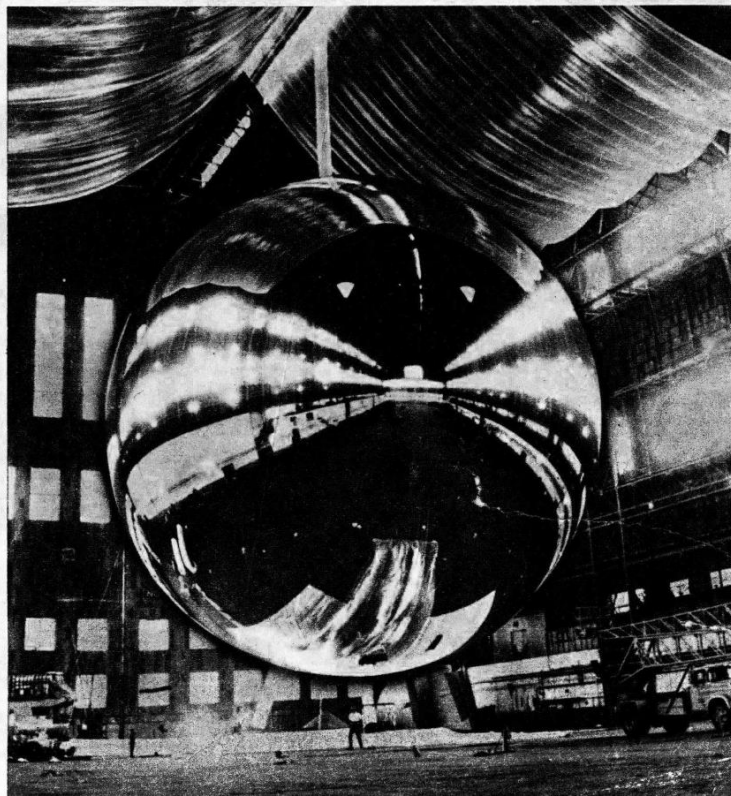


RANGER'S ace cameramen take you on another trip round . . .

YOUR world TODAY

▲ Who said man could not fly? The man who looks as though he is coming in for a three-point landing, is actually an American footballer. The cameraman has caught him in mid-air as he dives on to the ball during a practice match for the American Air Force European Championship.

Here is a balloon which would cause a sensation at your Christmas party—if you had enough breath to blow it up! It is a 100 ft. diameter spherical satellite named 'Pageos' undergoing test inflation in a huge hangar in America. When it is shot into space next year as part of the United States 1966 space programme, it will orbit the earth at an altitude of about 2,300 miles. ▶



▶ Although lions are kept as domestic pets by some people in Ethiopia, everybody stayed at a respectful distance from this one which was tethered to the top of the passenger steps at Addis Ababa airport. It was there as part of a special welcome arranged for American astronauts Gordon Cooper and Pete Conrad when they visited Emperor Haile Selassie's country.

Now, what goes on here? Well, it isn't a window cleaner's idea of a joke. In fact, the man up the ladder is an electrician. When he came to a school to install some electrical equipment, he was told he must not scratch the new gymnasium floor. So he took off his rubber shoes and fitted them on to the bottom end of his ladder. ▶



YOU CAN LAUGH BUT IT'S TRUE!

A man who put his money into a telephone coin-box but could not get through to his number, became so angry that he jumped into his car and drove it straight at the kiosk. He completely demolished it, but losing his temper did him no good. He wrecked his car too, and police were able to catch him still sitting at the wheel.

Voilker Lange, a young German, is claiming compensation from a shipping firm because, he says, one of their liners was in collision with his car! The accident happened in the Straits of Gibraltar when 24-year-old Lange was driving his small amphibious car across the 15 miles of sea separating Ceuta, in Morocco, from the Spanish coast. "I saw the ship, a 10,000 tonner, coming up on my left," he said. "It was a bit rough, but visibility was good. I blew my horn, and she came straight at me, so I jumped overboard and swam out of the way."

Lange's Amphicar sank, but he was spotted by the ship which returned to pick him up.



He may look as though he is playing a musical instrument in a military band, but he is an American infantryman fighting in Viet Nam. His 'instrument' is a bazooka rocket launcher, which fires armour-piercing missiles. They are a weapon which is normally used against tanks, but they can also be used to destroy concrete pill-boxes or other enemy strongpoints.

INTO THE BLUE Ace test pilot NEVILLE DUKE looks at the strangest aircraft yet...

NOW WE CAN FLY ON A KITE!

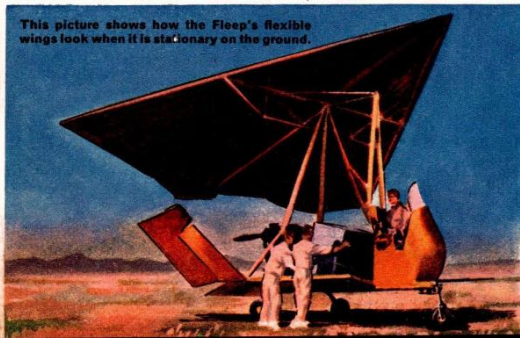
LOOKING like a giant-sized kite, an extraordinary new kind of flying machine nicknamed the Flying Fleep, has been developed by an American aircraft company.

These Flexible Wing Aerial Utility Vehicles, to give them their full name, are mainly for military use, and as you can see from the drawings on this page, various models have been designed for the American Army depending upon what job they are required to do.

The large drawing on the right shows the powered version which, of course, has a pilot and can carry a load equal to nine big sacks of coal. It is powered by a 210 h.p. 6-cylinder engine, which will take it to a height of 9,000 feet and it carries enough fuel to fly 100 miles, but the great advantage of this little flyabout is that it only needs a reasonably flat surface of about 100 yards to get airborne, and is simple to fly. Unlike normal aircraft, the Fleep has only a joystick to control its flight and needs no rudder.

When the Fleep is at rest on the ground, its wings flap loosely on an aluminium tubing frame, but once it starts to move air fills them out to their curved shape and, like an ordinary kite, gives them the lift which takes the whole machine into the air.

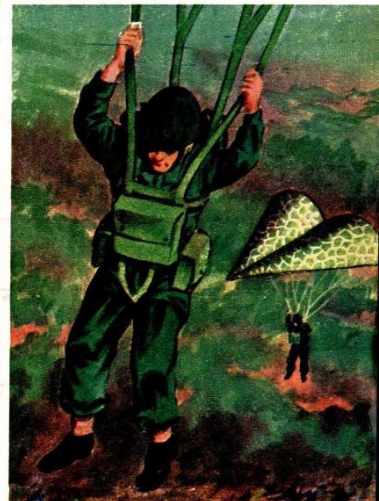
This picture shows how the Fleep's flexible wings look when it is stationary on the ground.



Front and side elevation drawings of the Fleep show how the wings are held in position when it is in flight.



Flexible wing gliders can be dropped from aircraft many miles from the battle zone and carry nearly a ton of cargo to waiting troops.



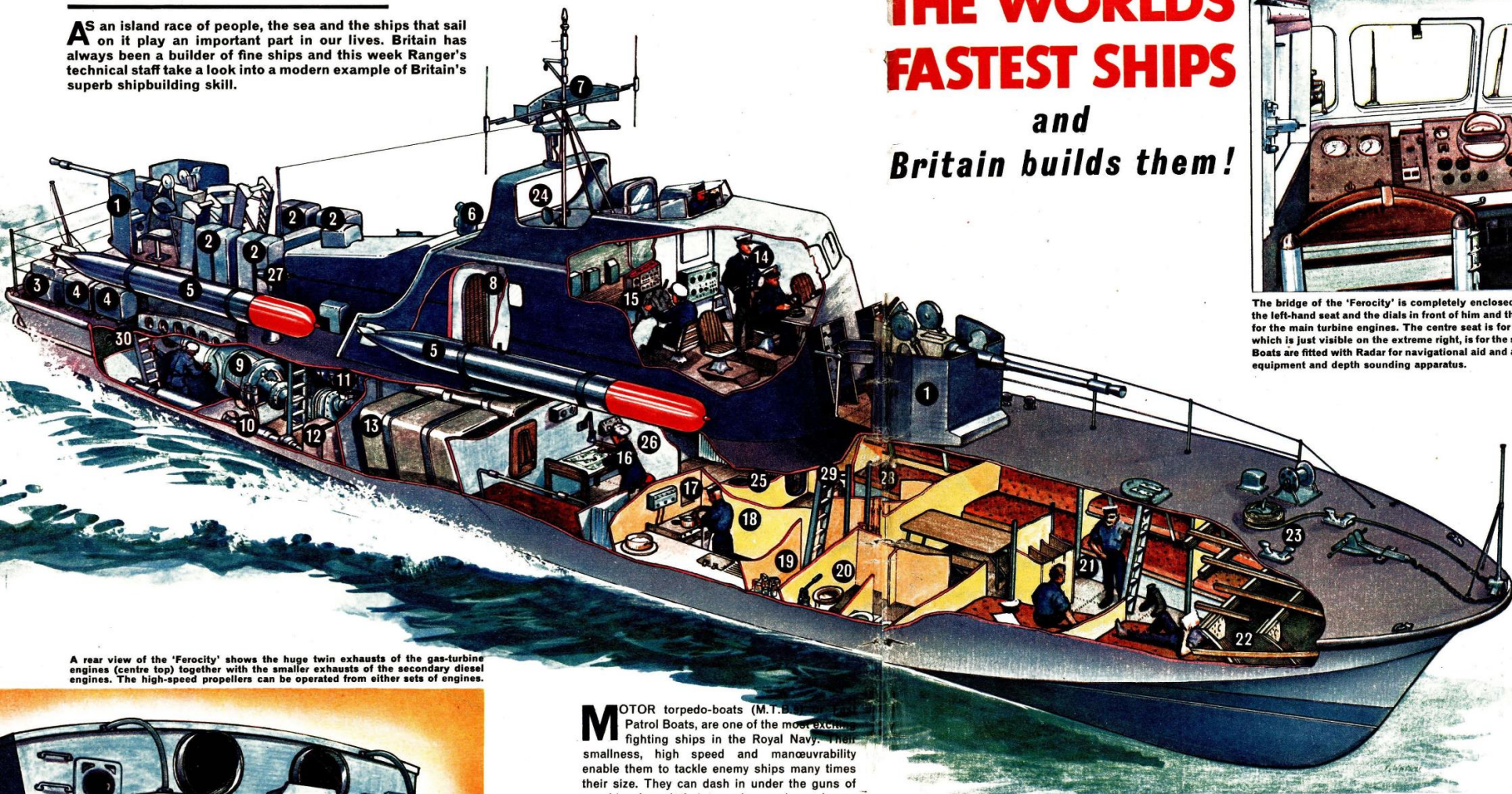
The flexible wing principle can be adapted for use as an ordinary parachute. Troops can land miles from where they were dropped.

Used as a glider, Fleeps can carry heavy loads of ammunition or other supplies. Helicopters are used to tow them into the battle areas.

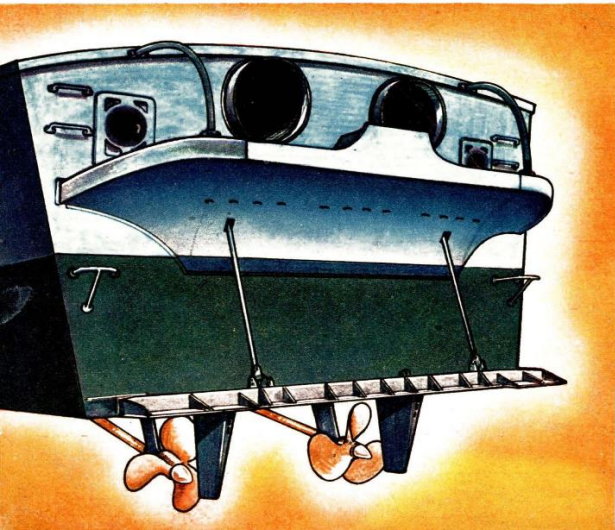


LOOKING INTO THINGS

AS an island race of people, the sea and the ships that sail on it play an important part in our lives. Britain has always been a builder of fine ships and this week Ranger's technical staff take a look into a modern example of Britain's superb shipbuilding skill.



A rear view of the 'Ferocity' shows the huge twin exhausts of the gas-turbine engines (centre top) together with the smaller exhausts of the secondary diesel engines. The high-speed propellers can be operated from either sets of engines.



THE WORLD'S FASTEST SHIPS and Britain builds them!



The bridge of the 'Ferocity' is completely enclosed. The commanding officer sits in the left-hand seat and the dials in front of him and the controls to the right of them are for the main turbine engines. The centre seat is for the helmsman, and the third seat, which is just visible on the extreme right, is for the squadron commander. Fast Patrol Boats are fitted with Radar for navigational aid and all the latest radio communication equipment and depth sounding apparatus.

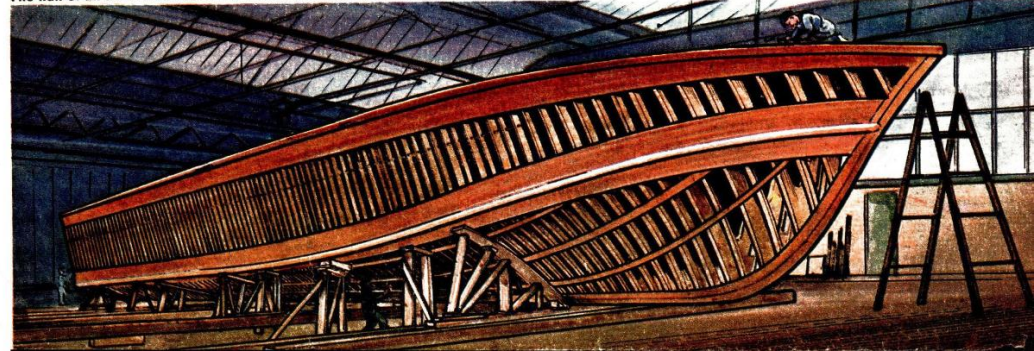
1. Bofors L/70 40 m.m. gun.
2. Rocket flare launchers.
3. Depth charge.
4. 40 m.m. ammunition lockers.
5. Torpedoes.
6. Gyro-compass master unit.
7. Radar scanner.
8. Radio-active decontamination cubicle.
9. Starboard Proteus gas-turbine engine.
10. Gas-turbine generator for electricity.
11. Starboard diesel cruising/manoeuvring engine.
12. Lubricating oil tanks.
13. Main fuel tanks—4,700 gals.
14. Helmsman.
15. Engine control panel.
16. Navigator's chart table.
17. Serving hatch.
18. Galley.
19. Provision store.
20. Crew's lavatory.
21. Crew's quarters.
22. Forepeak.
23. Nylon anchor cordage.
24. Loud hailer.
25. Radar screen.
26. Officers' wardroom.
27. Rocket flare launcher.
28. Officers' cabin.
29. Officers' lavatory.
30. Air filtering compartment.

MOTOR torpedo-boats (M.T.B.) and Patrol Boats, are one of the most exciting fighting ships in the Royal Navy. Their smallness, high speed and manoeuvrability enable them to tackle enemy ships many times their size. They can dash in under the guns of warships, launch their torpedoes and speed away at more than 50 knots—or nearly 60 m.p.h.

The Royal Navy's Fast Patrol Boats are known as the 'Daring' and 'Brave' class, but our artist has illustrated one named 'Ferocity', which is an experimental vessel built by Vosper of Portsmouth. Knowledge gained from it has been incorporated into a number of Fast Patrol Boats built for several of the world's navies.

Unlike the Royal Navy's boats, which have three Proteus gas-turbine engines as their main propulsion units, the 'Ferocity' has two and, at 88 ft. is slightly shorter. Its armament consists of four 21-inch torpedoes, and two 40 mm. Bofors guns. Apart from its main engines, the 'Ferocity' is fitted with twin diesels which are used for cruising over long distances. Smaller gas-turbine engines supply it with electrical power.

The hull of an M.T.B. can be either aluminium alloy framing (as below) covered with two layers of mahogany planking or of all wood construction.



RANGER

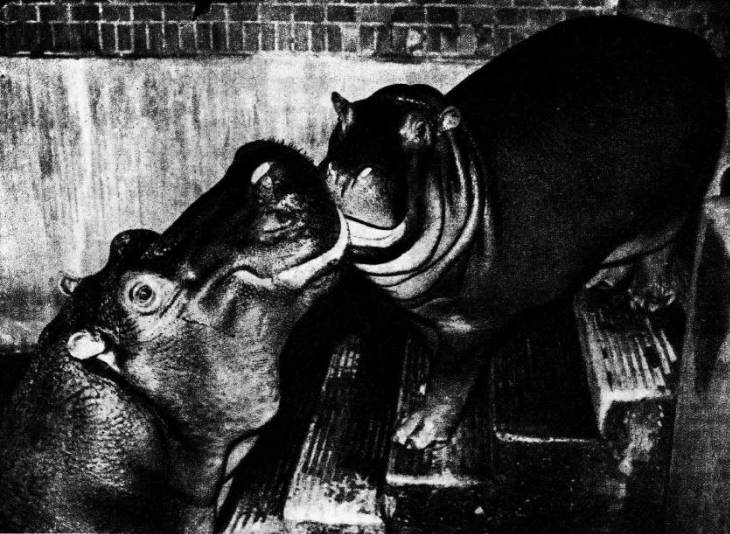


THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

**Inside: The story of
CAT'S EYES CUNNINGHAM
— Britain's night-fighter
hero**

DEC · 18 · 1965 · 1/-



YOUR WORLD TODAY

◀ "All right, Mum! There's no need to fuss. You know jolly well I have washed behind my ears. In fact, I'm washed all over. The water was a little muddy perhaps, but what could be better than a mud bath for keeping me beautiful. Anyway, I'm a hippopotamus and I'll be spending most of my life in the water. So, move over, Mum, I'm coming in again."

▶ You may think it would be easier to break a piece of wood with an axe—and you would be right, but this man is an expert in Karate, a form of self-defence practised in Japan, and he is demonstrating the tremendous power which can be developed in the feet. But don't try this sort of thing yourself—it takes years of training and can be dangerous.



YOU CAN LAUGH— BUT IT'S TRUE!

● Recently, a notice appeared on the bulletin board in San Jose College, California. It read as follows: "Wanted. A student to work on nuclear fissionable isotope molecular reactive counters and three-phase cyclotronic uranium photosynthesisers. NO EXPERIENCE NECESSARY." When a student applied for the job he was asked if he wanted anything explaining before he started work. "Yes," he said. "What does the notice mean?"

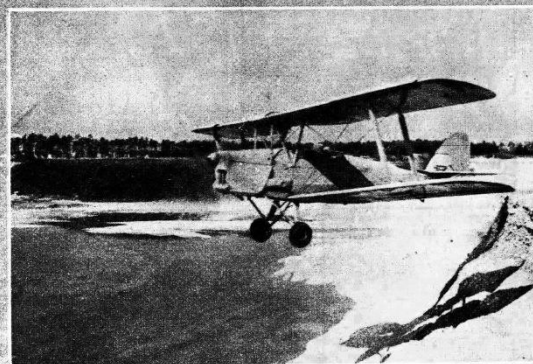
● Motorist Sam Ginger left his car out in his drive all night. The next morning he jumped in to go to work as usual, pressed the starter button, and slammed it into gear. But instead of moving forward normally the car ploughed its nose into the ground. Someone had stolen his front wheels during the night and left the car raised on its jack!



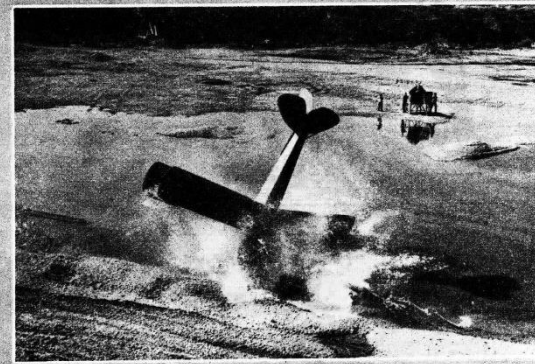
▶ The photographer had a shock when he developed his film and saw this picture. But he had not found a man with X-ray eyes. A closer look showed it was just the reflection of a dartboard in the man's glasses.

▲ It looks like a duet for flute-players, but the large figure is a bronze statue in the playground of a school in Germany, and the young pupil with the recorder can play a much better tune!

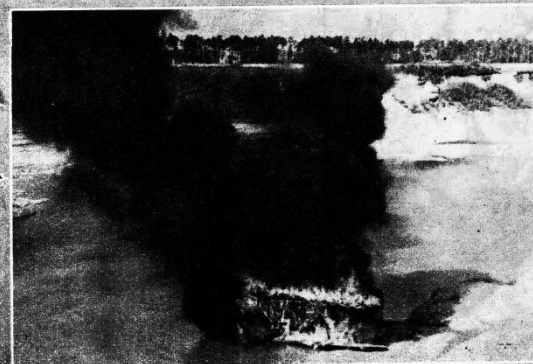
CRASH under control!



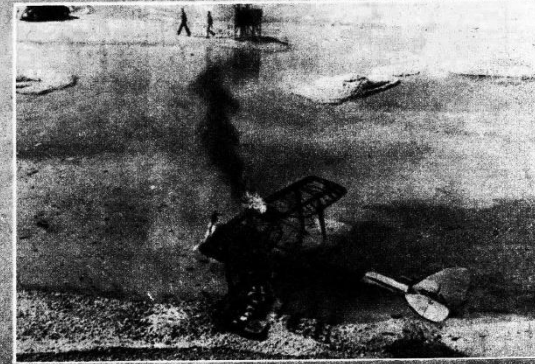
With a lifelike dummy in the cockpit, the plane flashes into view.



The film cameras in the background record the scene as it nose-dives.



A black pill of smoke rises high in the air as the plane catches fire.



It's all over. Only a charred wreck remains as the cameramen walk away.



WHY AMERICAN CARS ARE SO BIG

WHEN I climbed into the Buick Sportwagon (that's it on the right), built by General Motors of America, I got rather the same feeling that I get when I climb aboard a single-decker bus in Britain.

That feeling vanished as soon as I drove the shiny blue car effortlessly away. For in America all the cars are built 'in scale' with the massive bridges, roads and motorways over which they have to travel.

And that means that if the driver is to have a comfortable ride, the car must be really big and easy to drive.

Such cars have to travel thousands of miles over country quite different from the British countryside. Deserts, mountains, and coastal roads are vast and the long hours that the American driver must spend at the wheel cruising at 70 m.p.h. over broad expanses of highway can only be made pleasant by super cars, like the Buick Sportwagon of General Motors.

The range of designs offered to the American driver is almost limitless. He has a selection of four Sportwagons with a glass skyroof that you can see in the car in my picture. The skyroof consists of special shaded glass panels set in the roof that permit forward-facing third-seat passengers a look not only out but *up*. The skyroof provides almost as much headroom in the third seat area as in the front.

My technically minded readers may like to know that Sportwagons have a 210 h.p. V8 engine as standard equipment with a 250 h.p. Wildcat V8 as an optional. Yes—I really mean 250 horse-power!

Britain's youngest racing driver **GRAHAM TOMLINSON** looks at the American way of motoring.



DESERTS, MOUNTAINS, and LONG ROADS — THESE ARE THE



AMERICA'S MOUNTAIN AREAS demand powerful cars. This is the Oldsmobile 44-2 1966 model, with a 6,556 c.c. V8 engine built for high performance.



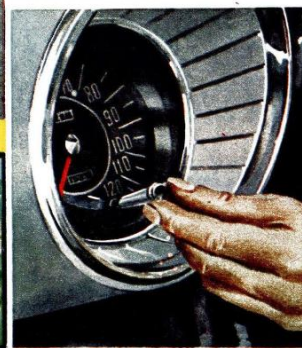
AMERICA'S DESERTS call for cars capable of travelling long distances economically. This is the 1966 version of the Chevrolet Corvette Sting Ray Sports Coupe.

TESTS THAT DEMAND POWER

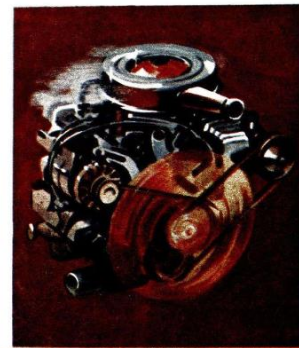


AMERICA'S BEACH-LOVERS demand luxury cars, like this Cadillac Fleetwood Brougham. It has carpeted foot-rests, reading lamps and a padded roof.

A FAVOURITE GADGET — AND A FAVOURITE ENGINE



AIDS to easy motoring gadgets are a necessity on a long drive in America. Take your foot off the accelerator and plug in to this electro-cruise mechanism on the speedometer—and your speed is maintained automatically! This is a favourite gadget on some General Motors cars.



ONE of America's most famous car engines is the Wildcat that develops 250 horse-power. This is the Wildcat 355, which powers the Sportwagon above as an optional. Car engines must be perfect—a breakdown in some parts of America could be miles from the nearest repair garage.

You may drive cars

THE pictures on the left and on the far right are an indication of how the designers of General Motors of America see the cars of the future.

On the left is the Runabout, a three-wheeled utility vehicle for the future city and suburban resident. It is built specially for shopping purposes and has its own built-in shopping cart system.

The car on the far right is a Firebird IV, designed for fast, comfortable, cross-country cruising on automatic highways.

Automatic highways are one of the principal ideas in the minds of designers of cars of the future. The motorist will "plug in" his vehicle to cables along the road and the car will be driven along the cable for him at constant speeds. Braking would be automatically "read" from the

like these in the future!

cable underneath the car or will be fixed by radar. Since exactly the same forces would apply to following cars, there would be no collisions.

These two experimental cars were designed by General Motors' styling staff. They are highly specialized, designed for a specific purpose and include many ideas for making tomorrow's motoring safer, easier, more fun and more efficient.

How the car of the future will be steered is still not decided. It may well be that the steering wheel will become out of date, and steering may then be done by a T-bar—rather like a bicycle's handlebars—or by levers.

Exciting, isn't it? And cars like this may one day be the kind of cars that you will drive!



RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY



**A
MERRY
CHRISTMAS
TO ALL
READERS**

SPACE CADETS IN ACTION
See pages 10 and 11

DEC · 25 · 1965 1¢

These funny hats didn't come out of a Christmas cracker! This is how villagers of Strumitza in Bulgaria dress up for a ceremonial dance to welcome the arrival of spring.



YOUR WORLD TODAY



Just in case you didn't believe it, there is more than one Father Christmas! And to prove it, here is a bunch of them waiting for a bus in London. They were on their way to work in various stores in the capital.

This is definitely not a good idea for a party game! Seminole Indians at Tropical Hobbyland in Miami, Florida, entertain visitors by handling alligators. Although they have special training, there is still an element of danger in getting so close to these powerful reptiles.

YOU CAN LAUGH— BUT IT'S TRUE!

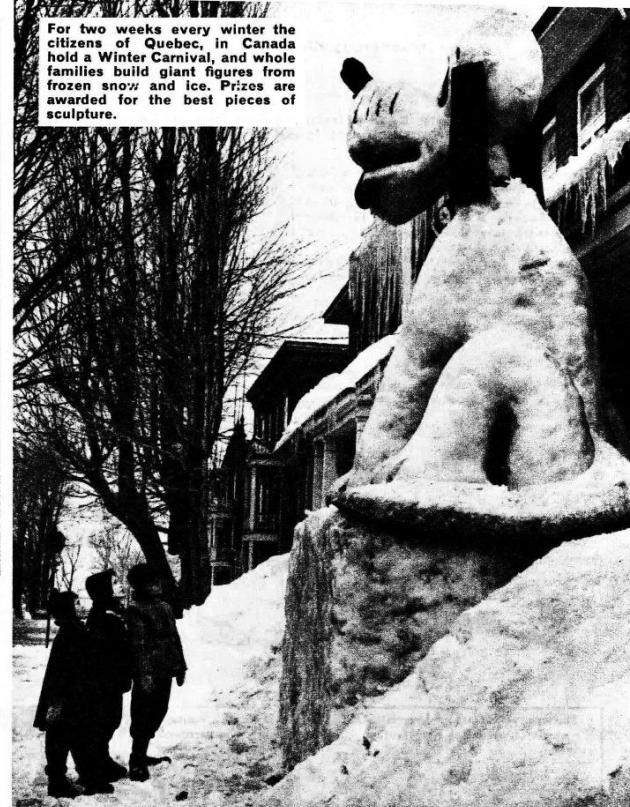


When thieves stole a pet gander for what they hoped would be a cheap Christmas dinner, its owner, Mrs. D. H. Luck of Little Ilchester, Northants, put out a warning to them. She said: "He is twenty years old and much too tough to get a knife and fork into."

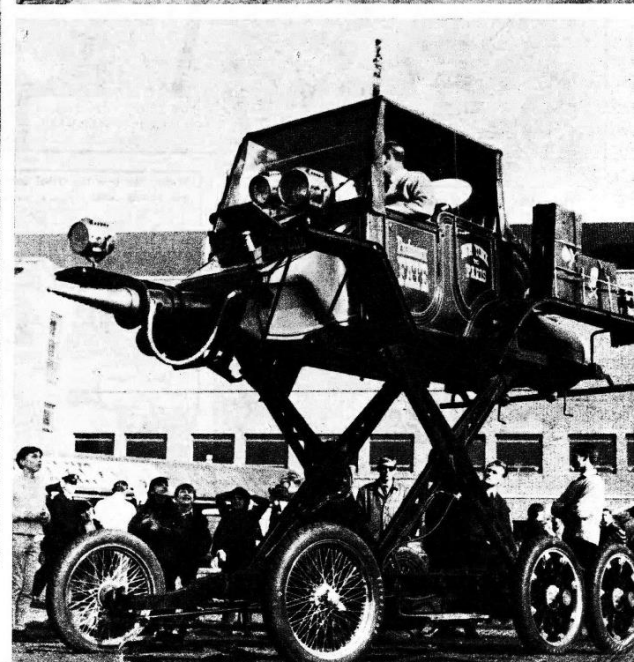
Fire prevention experts fitted a new valve to a fire hydrant in Huddersfield Town Hall, but before they could finish the job the water came on. In the nine minutes which went by before it could be turned off it blew the electricity system, caused a court of law to be abandoned, poured in a waterfall downstairs into the main hall and soaked seats arranged for a wrestling show.



For two weeks every winter the citizens of Quebec, in Canada hold a Winter Carnival, and whole families build giant figures from frozen snow and ice. Prizes are awarded for the best pieces of sculpture.



Here is a car which can rise above any traffic jam! It's called Hannibal 8 and was specially made to take part in a comedy film about cars.



THE BIGGEST AIRLINER IN THE WORLD

This week, test pilot NEVILLE DUKE tells you about the Antonov 22, Russia's giant passenger transport plane.



Sightseers at this year's Paris Air Show were staggered by the fantastic size of the Russian



Antonov 22. It flew direct from Moscow to Le Bourget airport in Paris and brought with it three single-decker buses plus assorted cargo.

RUSSIA has always been known for its giant aircraft, but this Antonov 22 (named after its designer, Oleg K. Antonov) is the largest ever to come out of that country and is bigger than any aircraft made either by Britain or America.

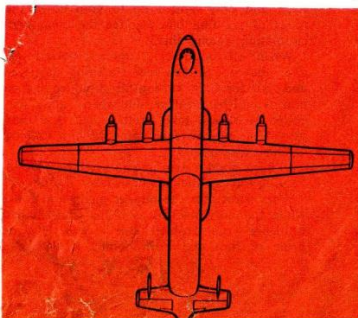
This monster passenger transport could also be used for lifting great military loads such as mobile missile batteries and heavy cross-country vehicles. Its huge 12-wheeled undercarriage has low-pressure tyres which enable it to land and take-off from rough grass airfields.

Inside, it has a pair of overhead travelling gantry cranes for moving loads about. Vehicles can be driven on and off by means of a ramp which is lowered from the rear of the fuselage. The crew entrance door is situated at the front end of the large 'pod' which houses the undercarriage wheels when the plane is in flight.

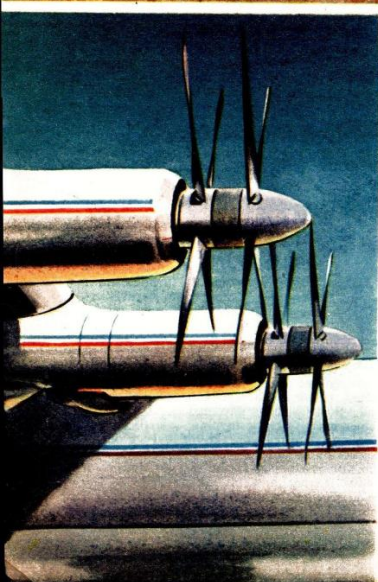
The An-22 is powered by four enormous 15,000 h.p. turboprop engines each of which drives an eight-bladed contra-rotating propeller. These give it a top speed of 422.5 m.p.h.

and a cruising speed of 410 m.p.h. It has a range of 3,107 miles and although the Russians did not say how many passengers it would carry, they did say an even larger version was planned which could carry 720 people and would have two or three decks!

The An-22 has a wing-span of 210 feet and an overall length of 187 feet, while its vast, 14 feet diameter cargo hold measures 105 feet from front to back. Below is a blueprint outline of the plane as viewed from above.



Here is a dramatic view of two of the twin-prop engines. The propellers on each engine rotate in opposite directions.



The drawing below shows the giant Antonov 22 at the moment of touch-down. The rear bogies of its multi-wheel landing gear

contact the runway first. Then as it slowly loses speed all twelve wheels take the massive weight and finally the double nose-

wheel comes into action. Once on the ground, the pilot can reverse the pitch of the propellers to help bring it to a stop.



RAILWAY DAYS AND WAYS ... BRITAIN'S CRACK EXPRESS STEAM ENGINE

brought to you by TV personality and railway enthusiast **DAVID NIXON**

ENGINEERS called her one of the finest examples of engineering of the nineteen-twenties. Travellers marvelled as she sped non-stop over the 392-mile route between London and Edinburgh.

She was the first engine in Britain to record officially a speed of 100 m.p.h. and her pre-war record of 2 hours 32 minutes for the 188 miles

between London and Leeds has never been bettered.

She is, of course, the world famous Flying Scotsman. The engine that you see here was withdrawn from service by British Railways in 1963 after covering more than two million miles, and was later bought by a Nottingham businessman. Now restored to her original London and

North Eastern Railway apple-green livery, she works privately run "specials" anywhere over British Railway lines and in the last three years has been seen by tens of thousands of people.

The train called the Flying Scotsman still runs regularly on the London to Edinburgh route. Today, however, it is always pulled by one of the powerful Deltic diesel locomotives.

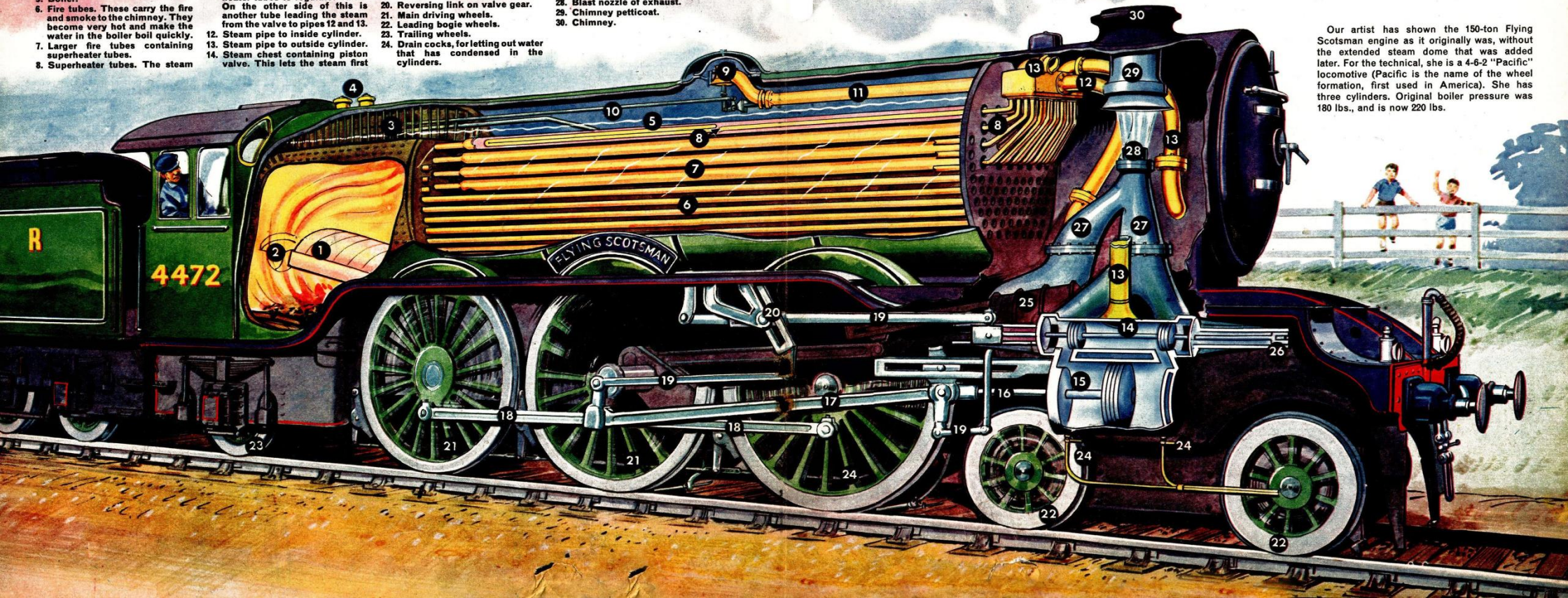
HERE IS THE KEY TO THE BIG PICTURE OF THE FLYING SCOTSMAN

1. Firebox.
2. Firebox door with deflector above it.
3. Firebox stays. These support the firebox in the boiler.
4. Pop safety valves. They release the steam if the pressure in the boiler rises higher than the set working pressure. When this happens they start with a loud "pop".
5. Boiler.
6. Fire tubes. These carry the fire and smoke to the chimney. They become very hot and make the water in the boiler boil quickly.
7. Larger fire tubes containing superheater tubes.
8. Superheater tubes. The steam

- from the boiler is led through these tubes and is heated high above boiling point before it goes to the regulator valve.
9. Regulator valve. This controls the amount of steam going to the cylinders.
10. Regulator rod, linking the driver's regulator handle with the regulator valve.
11. Main steam pipe from superheater tubes to regulator valve. On the other side of this is another tube leading the steam from the valve to pipes 12 and 13.
12. Steam pipe to inside cylinder.
13. Steam pipe to outside cylinder.
14. Steam chest containing piston valve. This lets the steam first

- into one end of the cylinder and then into the other. It also allows the exhaust steam to escape.
15. Outside cylinder, showing piston.
16. Piston rod.
17. Outside connecting rod.
18. Coupling rods.
19. Valve gear. This operates the piston valve making it go backwards and forwards at the right time.
20. Reversing link on valve gear.
21. Main driving wheels.
22. Leading bogie wheels.
23. Trailing wheels.
24. Drain cocks, for letting out water that has condensed in the cylinders.

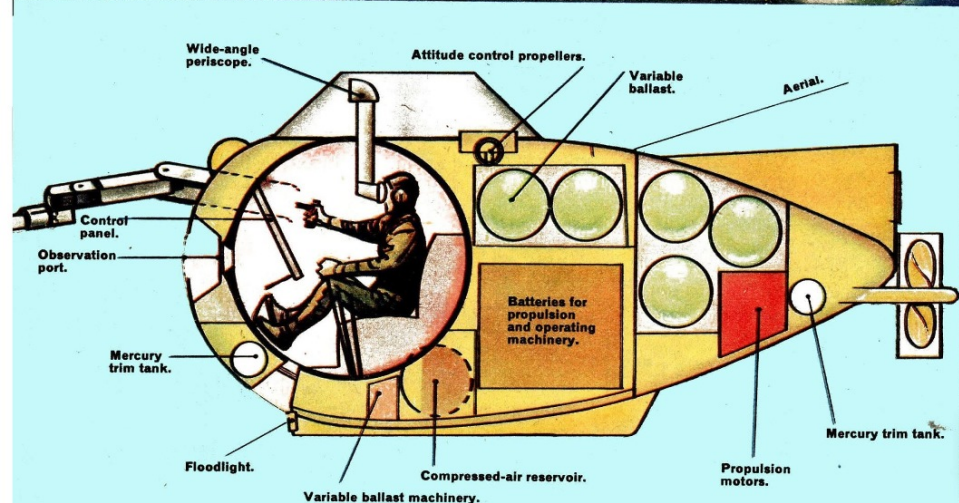
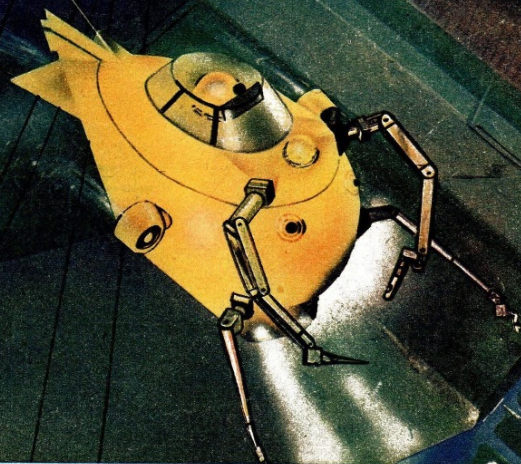
25. Inside cylinder. From this cylinder you can follow the piston rod, the inside connecting rod, down to the crank on the middle driving axle.
26. Extension to outside piston valve rod. The two outside piston valve extensions are linked in such a way that they operate the piston valve on the inside cylinder.
27. Exhaust pipes.
28. Blast nozzle of exhaust.
29. Chimney petticoat.
30. Chimney.



Watch out for this famous engine on your local railway line. It will have a board on the front with the name of the Railway Club who have hired it.

Our artist has shown the 150-ton Flying Scotsman engine as it originally was, without the extended steam dome that was added later. For the technical, she is a 4-6-2 "Pacific" locomotive (Pacific is the name of the wheel formation, first used in America). She has three cylinders. Original boiler pressure was 180 lbs., and is now 220 lbs.

LOOKING INTO THINGS



AN amazing new type of underwater craft known as 'manned submersibles' have been designed and built in America. Our cover artist has shown two of the latest types of these strange-looking man-made sea monsters which can carry out scientific exploration of the sea bed and do repair and maintenance work on oil-drilling platforms which rest on the shallower parts of the ocean floor.

Working at great depths below the surface of the sea has always been a difficult problem for air-breathing man to solve. Specially constructed research craft have reached the sea bed in some of the deepest parts of the world's oceans, but the men inside them have been able to do little more than peer out of the observation ports and observe the ocean floor within the range of powerful arc lights.

The maximum depth to which a man may safely go without any artificial breathing aid or pressure suit, is about 75 feet, although some pearl divers have reached depths of 100 feet, and remained under the surface for about one-and-a-half minutes. Divers wearing flexible rubber suits and helmets with a pumped supply of air do not normally work at depths

below 250 feet, and few modern atomic submarines can descend much more than 1,000 feet. Below that depth they run the risk of being crushed like a tin can by the enormous pressure of water.

But 'manned submersibles' have already descended to depths of 6,000 feet and later designs will dive as deep as 12,000 feet, where they will be able to recover minerals and rare metals from the sea floor. They can also be adapted for deep sea rescue work.

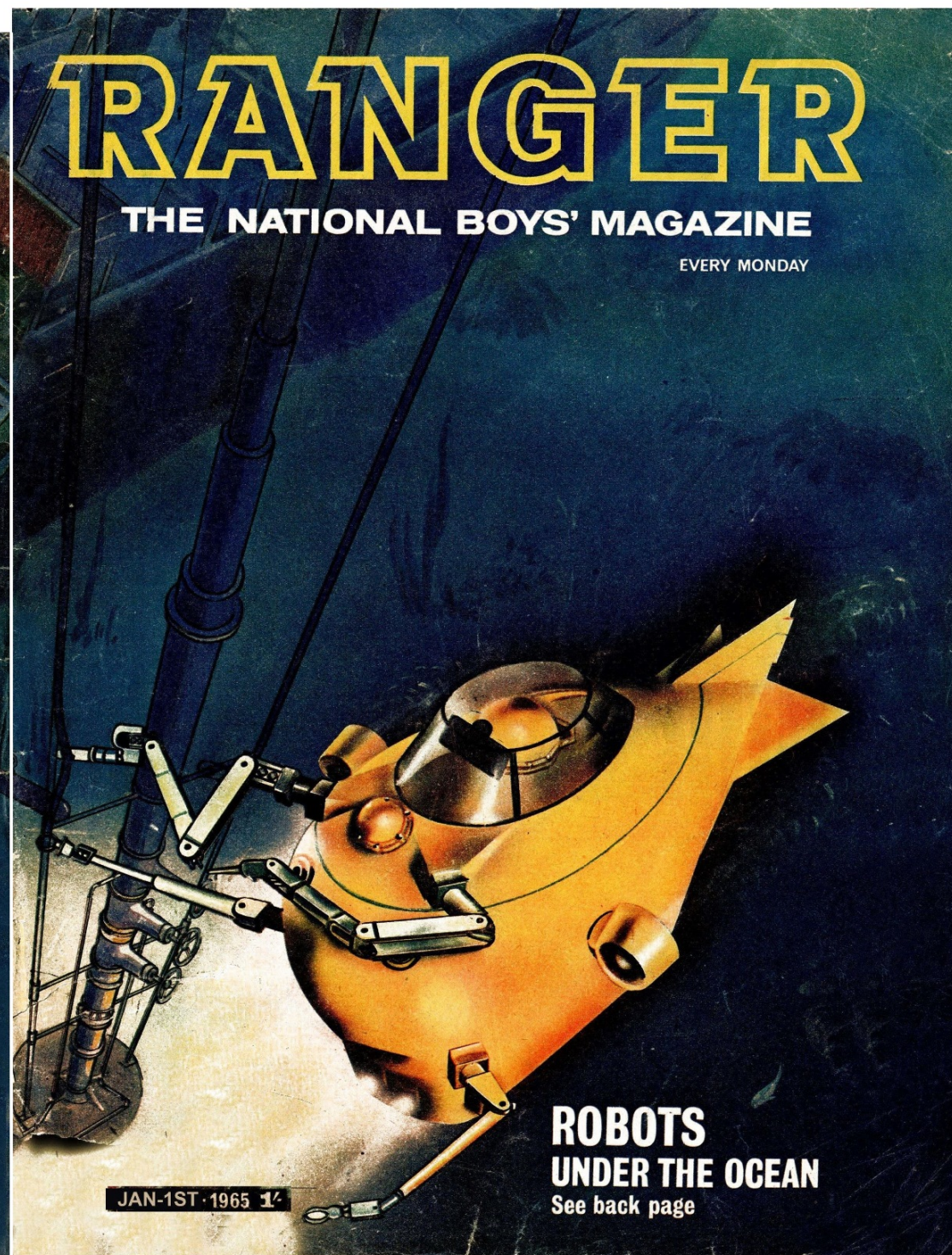
An immensely strong pressure-resistant sphere houses the operator, who controls the robot-like arms which can accomplish quite complicated underwater tasks.

Our cutaway drawing, which was adapted from material supplied by 'Science Journal', shows how that part of the hull containing the machinery, batteries, etc., is 'free flooded' leaving the control compartment filled with air. The craft descend in a slow spiral using the small 'attitude control' propellers to drive them. In an emergency the pressure resistant hull can float free and rise to the surface. The conning tower is used when the craft is travelling on the surface.

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY



**ROBOTS
UNDER THE OCEAN**
See back page

JAN-1ST 1965 1¢

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

ONE SHILLING

**ROUGH-RIDE AT
THE RODEO!**

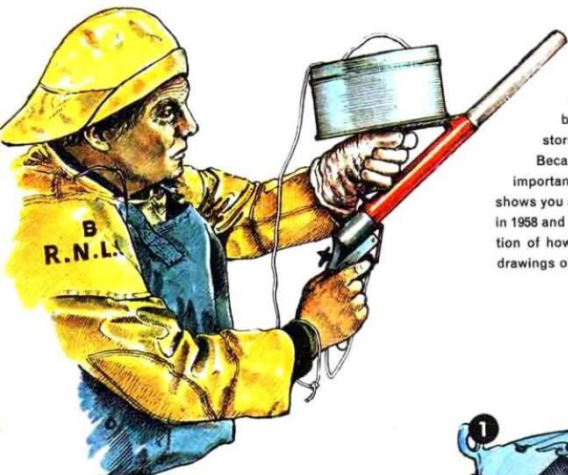
See pages 6 and 7



JAN · 29 · 1966

LOOKING INTO THINGS

MAN THE LIFEBOAT!



SAILORS all over the world have always saluted the courage of the men who man Britain's life-boats—with good reason. Since the Royal National Life-boat Institution was founded 142 years ago these tough seamen, all volunteers, have saved well over 86,000 lives. Whenever a call for help comes from a vessel in distress, the life-boatmen answer it—no matter what the weather, and it is nearly always stormy.

Because of the rough seas which life-boats encounter, their design is all-important and many different types have been built. To-day, Looking Into Things, shows you a 37-foot Oakley self-righting life-boat. The first of these came into service in 1958 and seventeen of them are now in operation around our coast. For an explanation of how this remarkable vessel rights itself should it overturn, see the smaller drawings on the left and at the foot of the page.

THE life-boatman in the drawing above is using a line-throwing pistol. Pulling the trigger fires a steel projectile with a line attached. The crew of a ship in distress use this line to pull a heavier rope over to them which can then be used for rescue purposes.

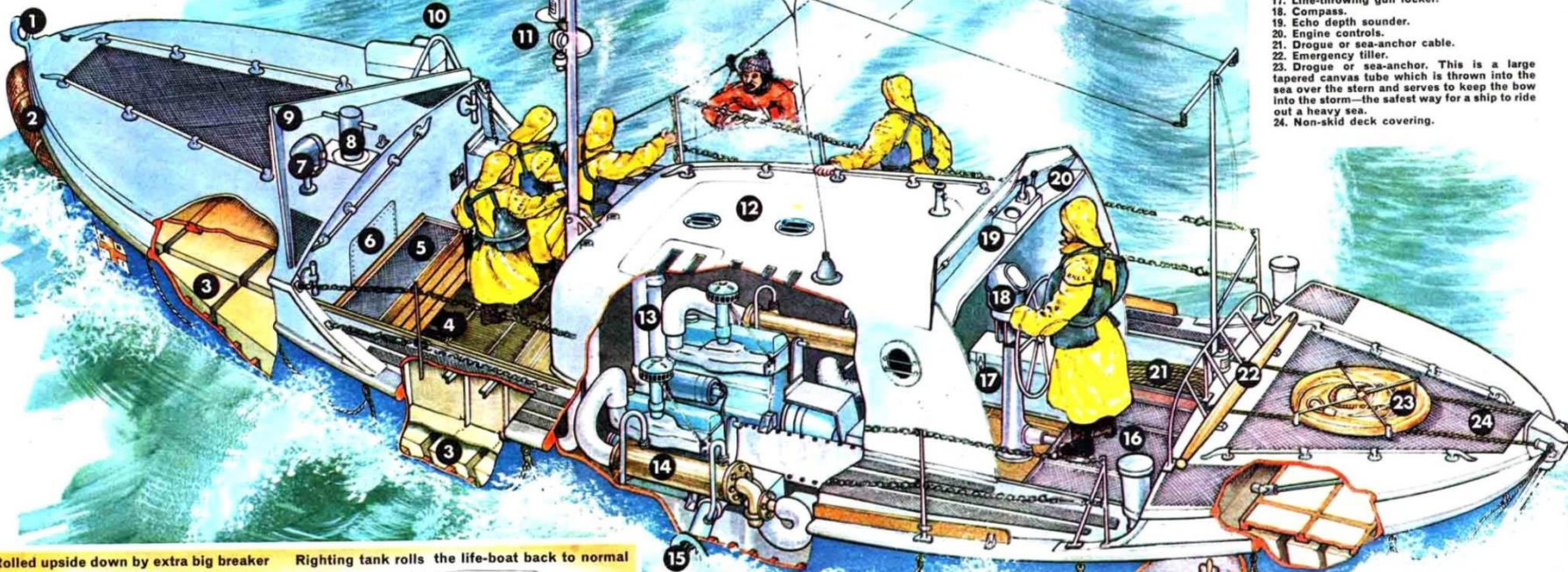
The self-righting life-boat works by transferring one-and-a-half tons of water ballast into a righting tank on its port side. When the boat is capsized to starboard she rights herself by going through a roll of 360 degrees.

It normally takes six seconds for her to reach upright from the moment she is bottom up. When the boat heels over to port, the transfer of water (see diagrams) begins just before the point at which she would otherwise capsize, and by this means the boat returns to upright.

The Oakley life-boat is powered by twin Perkins diesel engines of 43 b.h.p. She has a beach weight of just over 9 tons and carries a crew of between six and nine men. Each one costs about £26,500 to build and because they are mainly of wood construction and so few craftsmen are now left who can do this kind of work, they take about two-and-a-half years to complete.



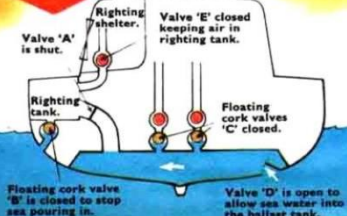
Once the Oakley rights itself, water which may remain on its decks drains away immediately. Now study the diagrams to see how it all works.



Key:

1. Bow fairlead. This is a metal ring through which an anchor chain or mooring rope can be passed.
2. Bow pudding—a heavy padded fender to protect the bow.
3. Air tanks for extra buoyancy.
4. Self-draining cockpit.
5. Stowage locker.
6. Watertight hatch.
7. Loud hailer.
8. Bollard for securing tow ropes.
9. Breakwater to protect cockpit from head seas.
10. Navigation lights.
11. Deck floodlight.
12. Deck shelter.
13. Air escape from ballast tanks.
14. Engine exhaust silencer.
15. Exhaust outlet.
16. Coxswain's platform.
17. Line-throwing gun locker.
18. Compass.
19. Echo depth sounder.
20. Engine controls.
21. Drogue or sea-anchor cable.
22. Emergency filter.
23. Drogue or sea-anchor. This is a large tapered canvas tube which is thrown into the sea over the stern and serves to keep the bow into the storm—the safest way for a ship to ride out a heavy sea.
24. Non-skid deck covering.

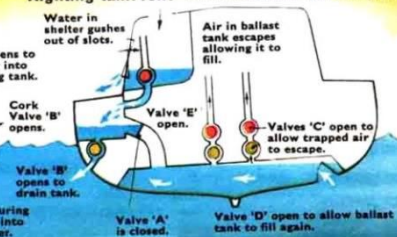
Floating properly



Rolled upside down by extra big breaker



Righting tank rolls the life-boat back to normal



INTO THE BLUE

BRITAIN'S GIANT TRANSPORTER

Test pilot NEVILLE DUKE takes a look at the Blackburn Beverley

THE Blackburn Beverley is the largest transport aircraft at present in service with the Royal Air Force. Its huge, main freight hold, which is 10 feet square and 40 feet long, together with its almost equally large tail compartment, enable it to carry 94 combat-ready troops for distances of more than 1,000 miles. Paratroops, when carried, can be dropped into the battle zone from its rear doors and through a hatch under the tail boom.

When it comes to carrying vehicles, the Beverley is no slouch, as you can see from our artist's drawing. Apart from large fuel tankers like this, various types of war vehicles of up to 14 tons can be rolled out of the rear opening and dropped on clusters of parachutes to support troops already on the ground.

The Beverley's large, tandem-type undercarriage enables it to

land and take-off from quite rough landing strips—a great advantage in wartime when troops may have to be taken to quite remote areas of the world where there are no concrete runways available.

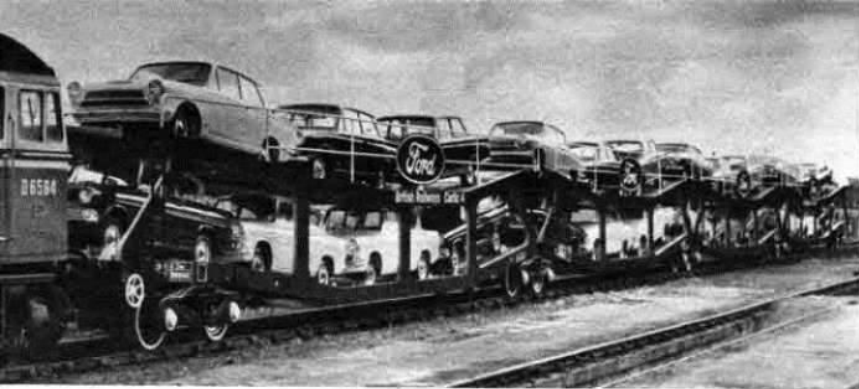
And now for a few technical details about this giant work-horse of the air. It has a wing-span of 162 feet, is just short of 100 feet long and stands almost 39 feet above the ground—higher than the average two-storey house!

Its four Bristol Centaurus engines of 2,850 h.p. each, give the Beverley a top speed of 238 m.p.h. at 5,700 feet, and it carries sufficient fuel to carry a 13-ton payload 1,300 miles. With its maximum load of 20 tons it will fly 230 miles.

A crew of four is normally carried—two pilots, a navigator and a radio operator.



J.H. Bathelet



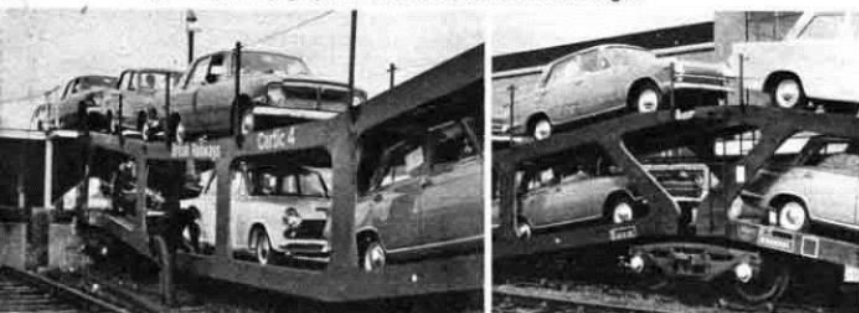
Watch out for these "Cartic 4s" which carry three or four cars on each section. This one has 25 cars loaded. The four sections share five bogies.

HAVE you got a "Cartic" in your model railway set? If you have, it will be a single wagon with a bogie at each end and not like the huge "Cartic 4s" where the four sections are joined by common bogies with unshared bogies only at the extreme ends.

British Railways designed these two-decker carriers to handle the thousands of cars which roll off the production lines every week—the Ford Company alone send 3,000 cars a week by rail to their distributors and to the docks for export.

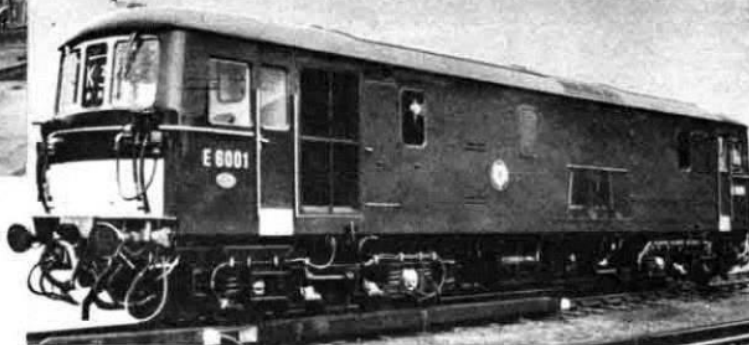
"Cartic 4s" are 203 ft. 5 ins. long. They are fitted with continuous brakes, roller bearings and are built for running with 75 m.p.h. trains. Cars can be driven straight on and off either deck from special loading platforms and they carry up to 34 of them depending on their size.

Here you can see how the special loading platform enables drivers to drive the cars onto the top deck, and (right) how two sections share one bogie.



RAILWAY DAYS

by TV personality and railway enthusiast DAVID NIXON



One of the original electro-diesels which have proved so satisfactory on the Kent section of the Southern Region.

UNUSUAL ELECTRO-DIESELS ON THE SOUTHERN REGION

SOUTHERN Region of British Railways has some special problems which are not found on other sections of our railway system. There was a great deal of electrification using the third (live) rail system.

When the railways were nationalized, the electrified section was closely linked with sections which were not electrified and never could be. Sidings and little local lines are not used often enough to make it worth while adding the third rail, and anyway, in a goods yard it would be dangerous.

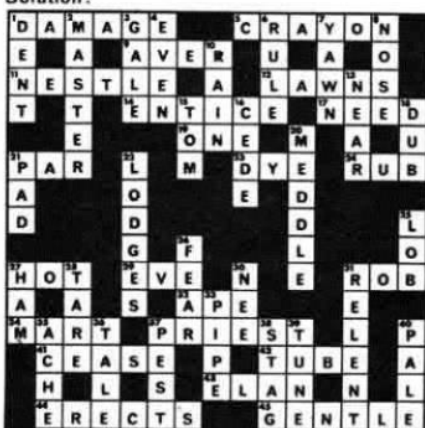
After a lot of thought it was decided to build a locomotive which could run on the standard 750 volt D.C. third rail system and, at the same time, have an auxiliary diesel engine which could be used on the non-electrified sections of the line. The result is the Electro-diesel. Eight have been built and used successfully on the Kent section. Now more of this class are being built and soon they will be seen all over the Southern Region.

RANGER CROSSWORD No. 11

Record tokens were awarded to:-

Franklyn Allen, Northolt; Richard Barnard, Newbury; Christopher Batson, Southsea; Roger Benbow, Mitcheldean; Richard Buckley, Darlington; Ralph Bunker, Reading; Roger Cagney, Dublin; Andrew Carter, Hampton; Mark Coakley, Liverpool; Jeremy Comfort, Chorley; Wood; Terence Copley, Halifax; Paul Coulthard, Preston; Alan Evans, Brockworth; Timothy Fuery, King's Norton; Stephen Funnell, Newhaven; Michael Geall, Bognor Regis; Paul Gallacher, Basildon; R. George, Stourbridge; Seamus Gilmore, Belfast; Trevor Goulding, Salisbury; Jimmy Hawke, Anglesey; Christopher Hockley, Ipswich; Jeffrey Hopkinson, Lincoln; Timothy Hudson, Sheffield; Stephen Humphries, Calne; Brian Huntley, Staines; David Locke, Slough; Niall Macdonald, Aberdeen; Alistair Magee, Glasgow; Alan Millar, Lisburn; David Millin, Wythenshawe; John Monahan, Letchworth; David Moore, Great Bridgeford; Allen Morgan, Dublin; Trevor Morris, Wembley Park; Leonard Mutch, Eilon; Nigel Poole, Almondsbury; Martyn Postle, Newport; Michael Povey, Boston; Robert Poxon, Blackpool; Nicholas Rogers, Sidcup; Barry Round, Sedgley; Stuart Seaton, Earliston; James Shand, Keith; Stephen Smith, Birmingham; J. W. Sowry, Esher; C. Sutton, York; Andrew Upson, London, S.E.9; Roger Wilkins, Frome; Cyril Wilmot, Winchester.

Solution:



Did you guess correctly about which of the two pictures in Your World Today on page 2 was printed right way up? It was the one on the right as you can see from this full-length photograph of the two acrobats. They are known as the Eltons and are a father and son act. Mr. Elton senior is the one underneath.



SEA CHANGE

Continued from page 13

ground of their minds like old half-forgotten yarns.

In two days they knocked off just under five hundred miles.

"Four more days at this rate," croaked Calamity when the mate gave them the distance run that noon—"four more days and we'll raise the Scillies. It's all over bar the shouting."

But that night, at eight bells in the second dog-watch, old Andy called Cam into the chart-room. He was bending over the table, and the moment the lad saw the grim face harshly lit in the light flung back from the white chart, he knew they were up against it once more.

"You wanted me, sir?" he said quietly.

For a moment Andy didn't move and gave no sign that he had heard, then suddenly he swung round and shot a question.

"You did a fair bit of swotting at navigation while we were round the islands, didn't you, Cam?"

Cam hesitated. "Well, yes, sir."

"And you know the feel of a sextant in your hand?"

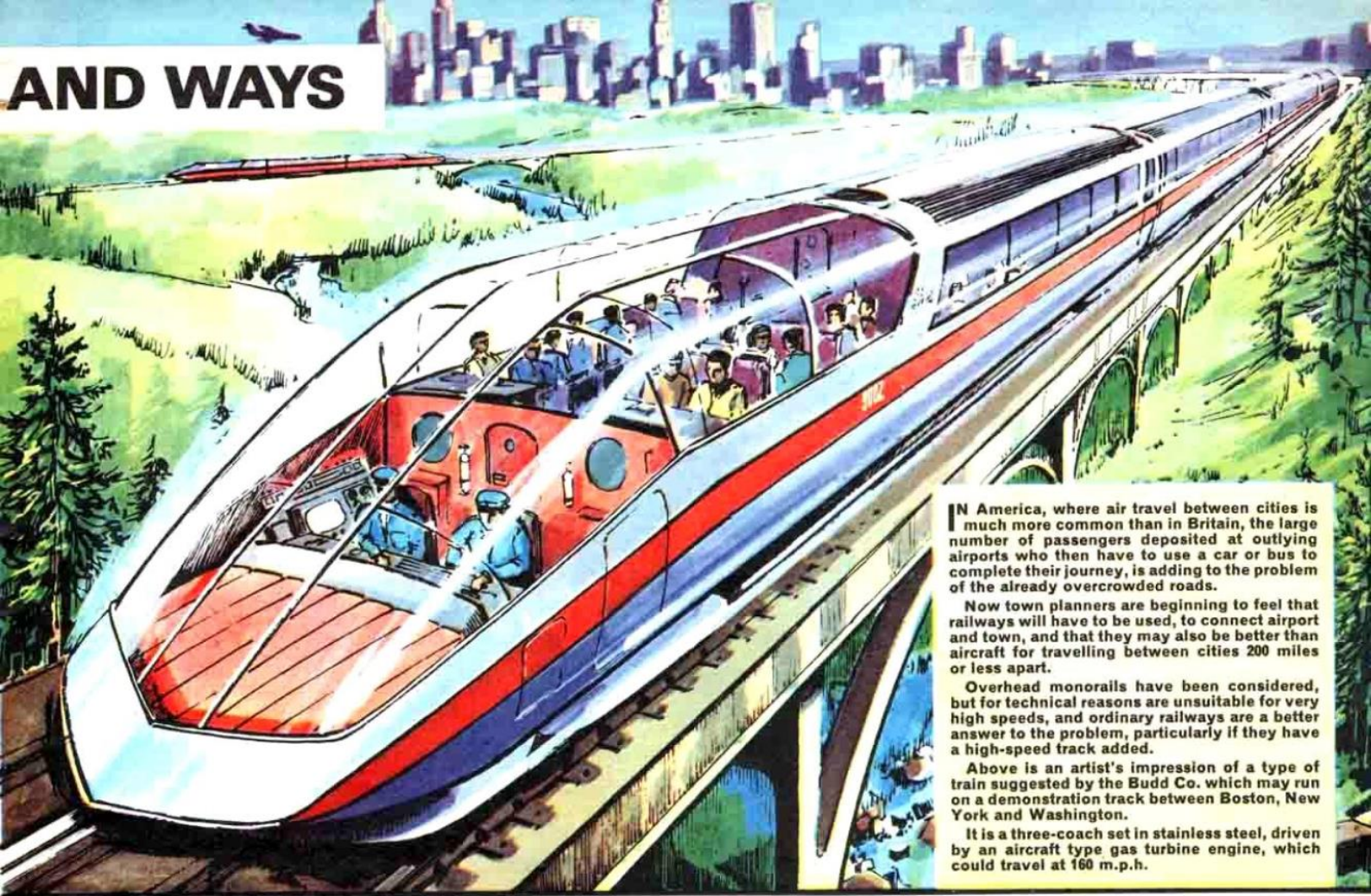
"There's one in my room in the Langdale, sir, and I messed around with it a lot in Cardenas Bay, but never worked up any of the angles I shot." Cam saw now Andy's face was grey with pain. "Anything gone wrong, sir?"

The mate sighed. "Plenty, and to spare. Take a look at that."

He thrust out his right hand and Cam gasped. The huge fist was swollen to almost double its normal size, and the wrist, usually so bony, was puffed as big as the calf of a man's leg.

Next week: **Homeward bound**

AND WAYS



IN America, where air travel between cities is much more common than in Britain, the large number of passengers deposited at outlying airports who then have to use a car or bus to complete their journey, is adding to the problem of the already overcrowded roads.

Now town planners are beginning to feel that railways will have to be used, to connect airport and town, and that they may also be better than aircraft for travelling between cities 200 miles or less apart.

Overhead monorails have been considered, but for technical reasons are unsuitable for very high speeds, and ordinary railways are a better answer to the problem, particularly if they have a high-speed track added.

Above is an artist's impression of a type of train suggested by the Budd Co. which may run on a demonstration track between Boston, New York and Washington.

It is a three-coach set in stainless steel, driven by an aircraft type gas turbine engine, which could travel at 160 m.p.h.

Lift-off!

New Brooke Bond Picture Cards

TRANSPORT THROUGH THE AGES



Planes, trains, ships, cars! Here's the whole history of transport, from horses and camels to rockets and jets! All colourfully illustrated and fully described in the new Brooke Bond picture card series. Out now! Ask your grocer for a colourful, illustrated album to take all 50 cards in the new series. It costs only 6d. (Or write to Brooke Bond Tea Limited, Dept. PC, Goulston Street, London, E.1. Enclose 6d. postal order.) Cards and albums available in U.K. only.

Picture card free in every packet of
BROOKE BOND TEA

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

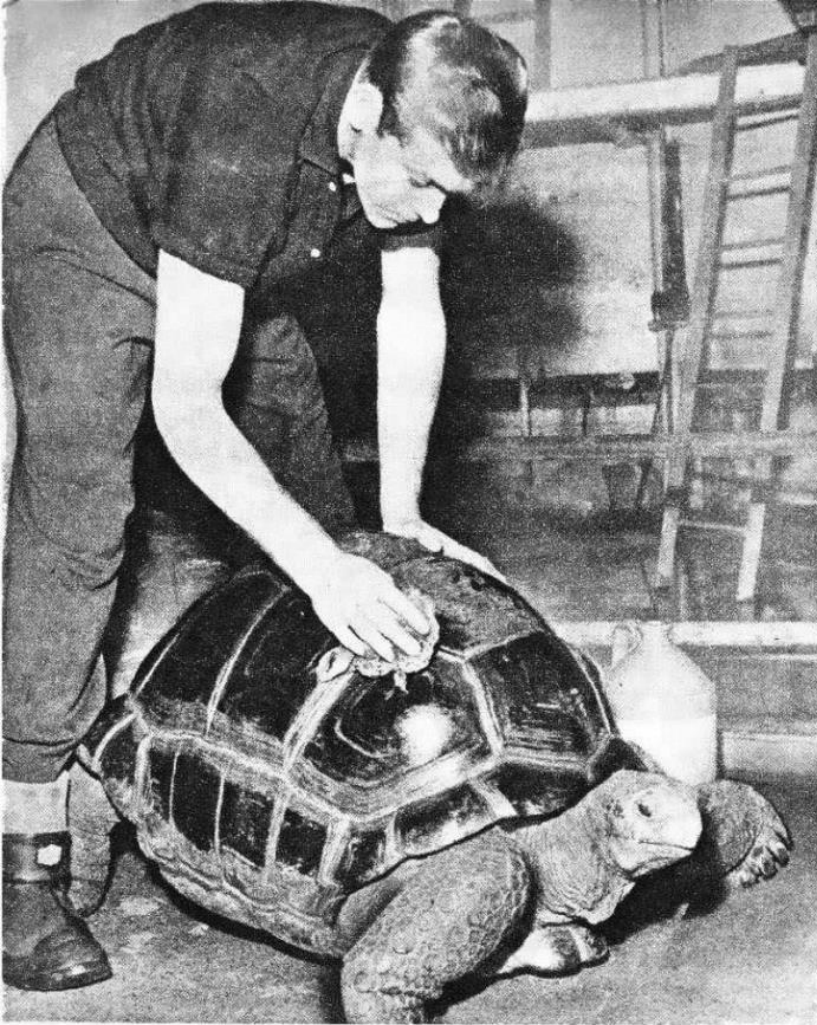
ONE SHILLING

SEA DRAMA OF THE FLYING ENTERPRISE

See pages 6 and 7



FEB · 5 · 1966



The world can be exciting, it can be fun, but it is never dull seen through the eyes of RANGER'S roving cameramen

YOUR world TODAY

● This giant tortoise is not having his shell polished by his keeper at the London Zoo, he is being oiled! To keep their shells supple during the winter they are rubbed over with linseed oil. Some of the tortoises in the zoo are nearly 100 years old and because of the warm conditions in which they are kept, they do not hibernate.

● Passers by had to look twice when they saw this strange, hooded figure riding on the back of this stone lion. Actually, he is just a workman cleaning it with a jet of compressed air which also contains grains of sand, and the hood is to protect his eyes. Where is it? It guards the entrance to a war memorial in Indianapolis, capital of America's State of Indiana.





If you think these two men are giving a gymnastic display you are wrong! Believe it or not they are taking part in a boxing match, at Bologna, Italy. James Shelton of California ducked away from a right-hand punch and his opponent just carried on—straight over his head.



No, the tongue hanging out of the sousaphone does not belong to the man playing it. He is a high school student in America and thought he would have a bit of fun during a Thanksgiving Day parade by turning his instrument into an outside insect. We haven't heard what kind of noise came out of it!

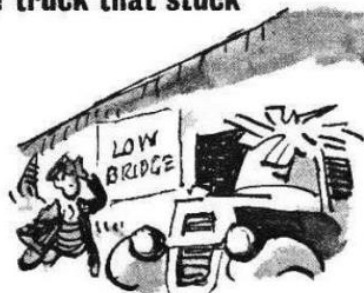
YOU CAN LAUGH—BUT IT'S TRUE!

The pup that played

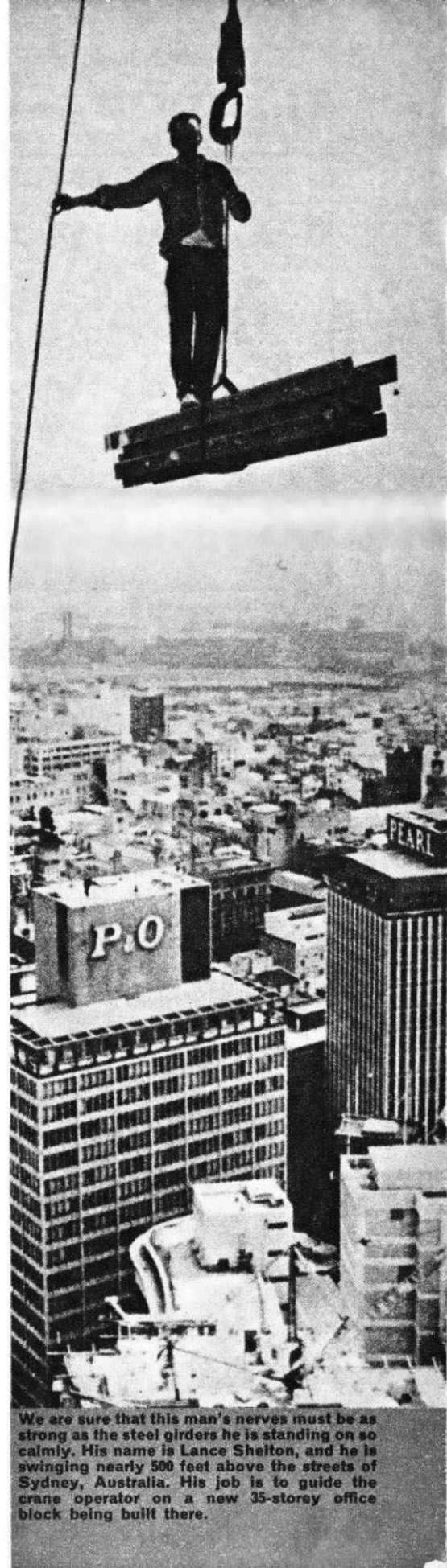
A woman returned a book to the public library in Maidenhead, Berkshire, and apologised to the librarian for the teeth marks on it. "My puppy chewed it, I'm afraid," she said. The title of the book was: Your Puppy and how to train it!



The truck that stuck



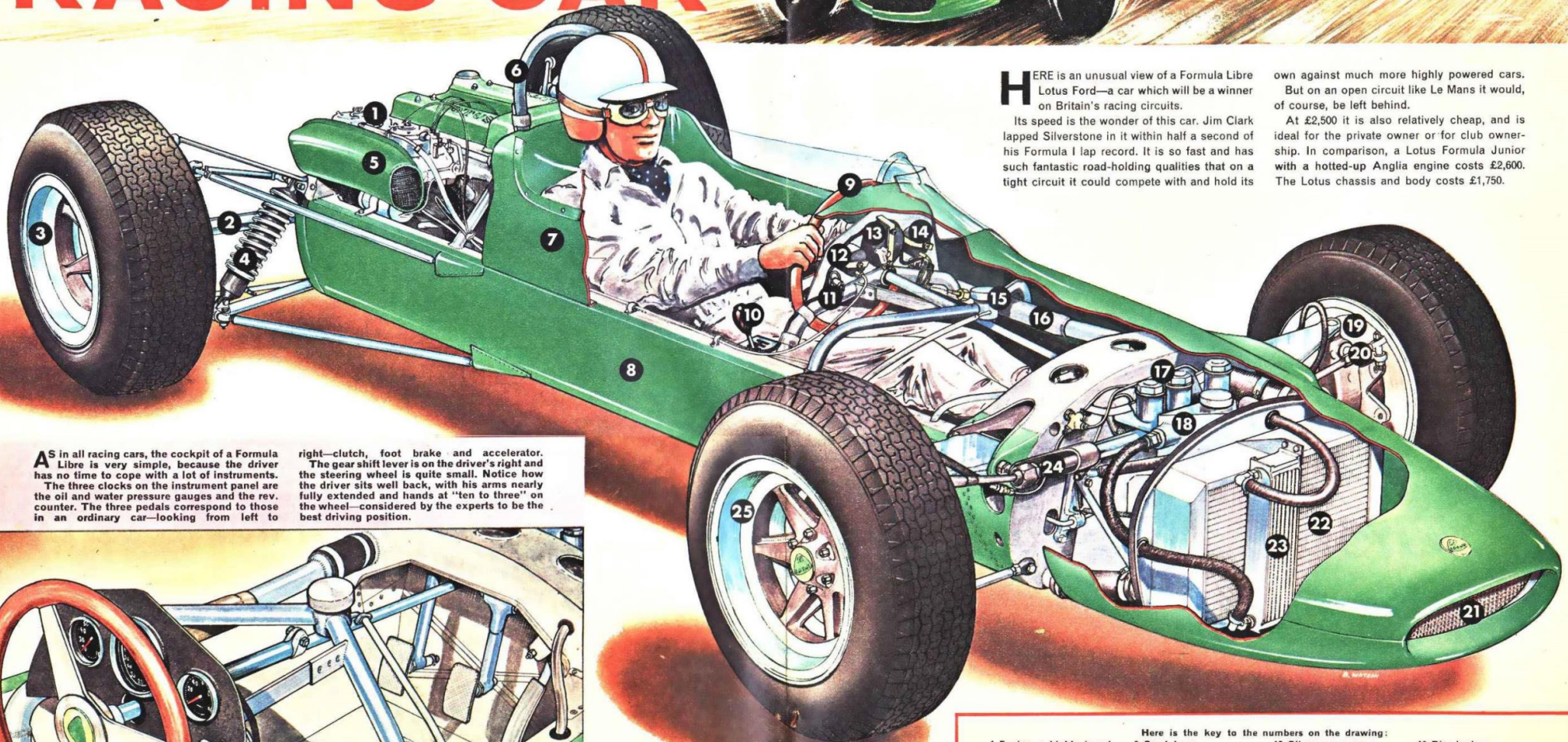
The driver of a large delivery truck failed to notice a 'Low Bridge' warning as he was driving his vehicle through a lane in Beckenham, Kent. He struck the bridge which ripped off the roof of his van. The name of the company who owned it? The Self-Opening Tin Box Company of Barking, Essex!



We are sure that this man's nerves must be as strong as the steel girders he is standing on so calmly. His name is Lance Shelton, and he is swinging nearly 500 feet above the streets of Sydney, Australia. His job is to guide the crane operator on a new 35-storey office block being built there.

LOOKING INTO THINGS

Inside a top class RACING CAR



AS in all racing cars, the cockpit of a Formula Libre is very simple, because the driver has no time to cope with a lot of instruments. The three clocks on the instrument panel are the oil and water pressure gauges and the rev. counter. The three pedals correspond to those in an ordinary car—looking from left to

right—clutch, foot brake and accelerator. The gear shift lever is on the driver's right and the steering wheel is quite small. Notice how the driver sits well back, with his arms nearly fully extended and hands at "ten to three" on the wheel—considered by the experts to be the best driving position.

HERE is an unusual view of a Formula Libre Lotus Ford—a car which will be a winner on Britain's racing circuits.

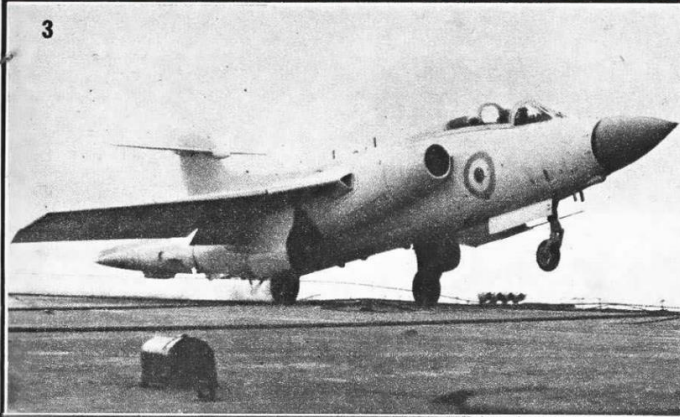
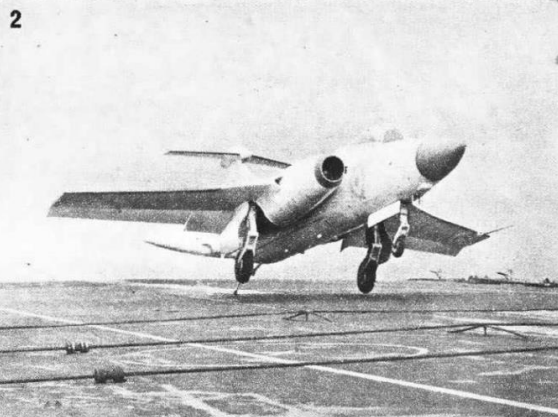
Its speed is the wonder of this car. Jim Clark lapped Silverstone in it within half a second of his Formula 1 lap record. It is so fast and has such fantastic road-holding qualities that on a tight circuit it could compete with and hold its

own against much more highly powered cars. But on an open circuit like Le Mans it would, of course, be left behind.

At £2,500 it is also relatively cheap, and is ideal for the private owner or for club ownership. In comparison, a Lotus Formula Junior with a hotbed-up Anglia engine costs £2,600. The Lotus chassis and body costs £1,750.

- Here is the key to the numbers on the drawing:
- | | | | |
|--|---|---------------------------------|--|
| 1 Engine, a highly tuned Cosworth-Lotus Ford. | 6 Crash hoop. | 12 Oil pressure gauge. | 19 Disc brakes. |
| 2 Back axle. (The part shown is the half-shaft.) | 7 Removable glass fibre panel. | 13 Tachometer (rev. counter). | 20 Steering arm. |
| 3 Magnesium alloy light-weight rear wheels with extra large tyres. | 8 Monocoque chassis and body unit with petrol tanks in sides. | 14 Water temperature gauge. | 21 Air intake. |
| 4 Spring shock absorber unit. | 9 Leather bound steering wheel. | 15 Petrol filler. | 22 Oil radiator. |
| 5 Cold air box. | 10 Gear lever. | 16 Water pipe for radiator. | 23 Oil radiator. |
| | 11 Push button starter. | 17 Brake and clutch reservoirs. | 24 Rack and pinion steering. |
| | | 18 Oil tank. | 25 Light weight front wheels with normal size tyres. |

STAND BY FOR LANDING



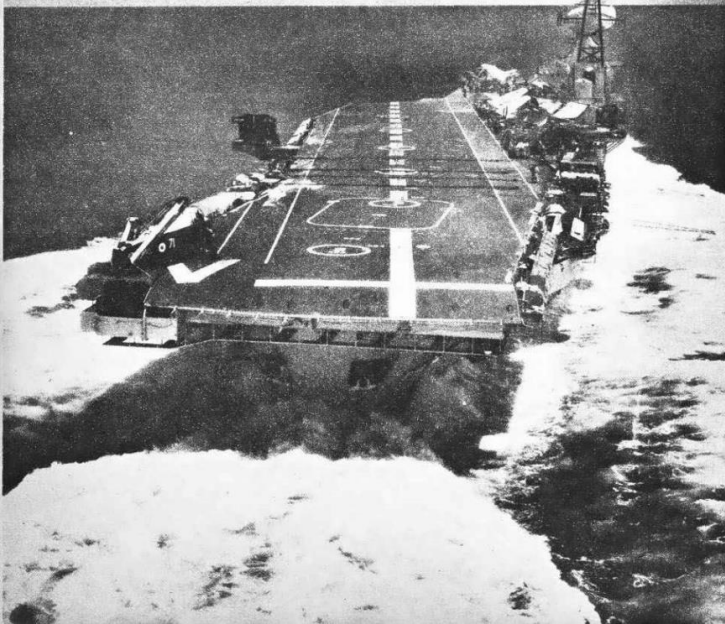
1 Like a giant bird reaching out with its claws, a Buccaneer strike aircraft of the Fleet Air Arm comes in to land with its hook down, flaps down, wheels down and air brakes wide open.

2 The arrestor hook is now clutching for one of the steel arrestor wires stretched across the deck of the aircraft carrier.

3 The hook catches in one of the wires as the main undercarriage wheels make contact with the deck, but the nosewheel is still up.

4 The arrestor wire has stretched to its fullest extent and with a neck-jerking heave, the Buccaneer comes to a halt. The nosewheel crashes down, but the plane is held safe and firm on the deck.

THIS magnificent photograph of an aircraft carrier steaming at speed was taken from the cockpit of a Buccaneer and gives a pilot's eye view of the flight deck as he turns to make his final approach. The broad, white line helps him to line up his plane so that he can make a perfect run in and hook on to the middle of the arrestor wires. The large rectangle is the outline of a lift to the hangar below the deck.

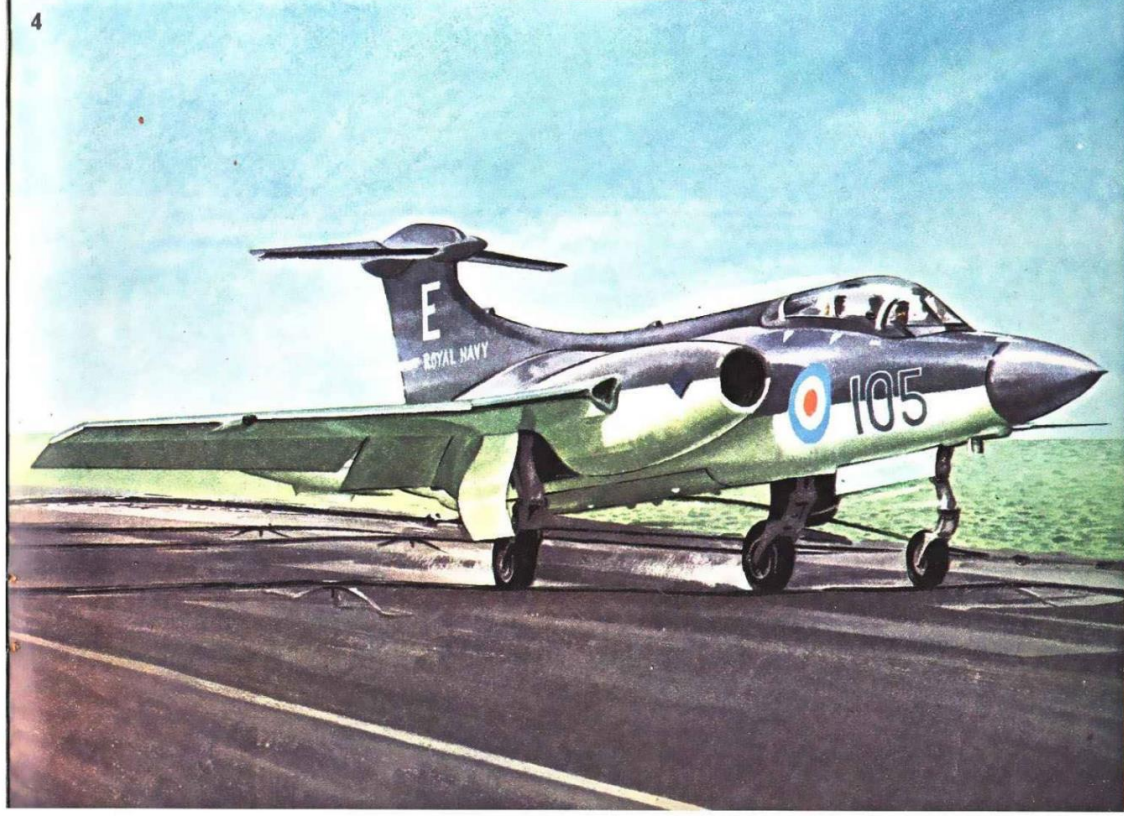
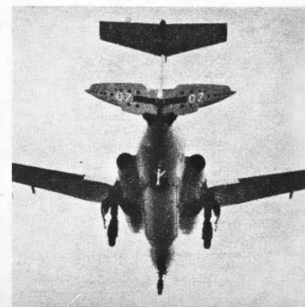


FROM 10,000 feet an aircraft carrier looks terrifyingly small in a vast expanse of ocean, but nevertheless it is all the pilot of a Fleet Air Arm plane has to aim for when he has completed his mission.

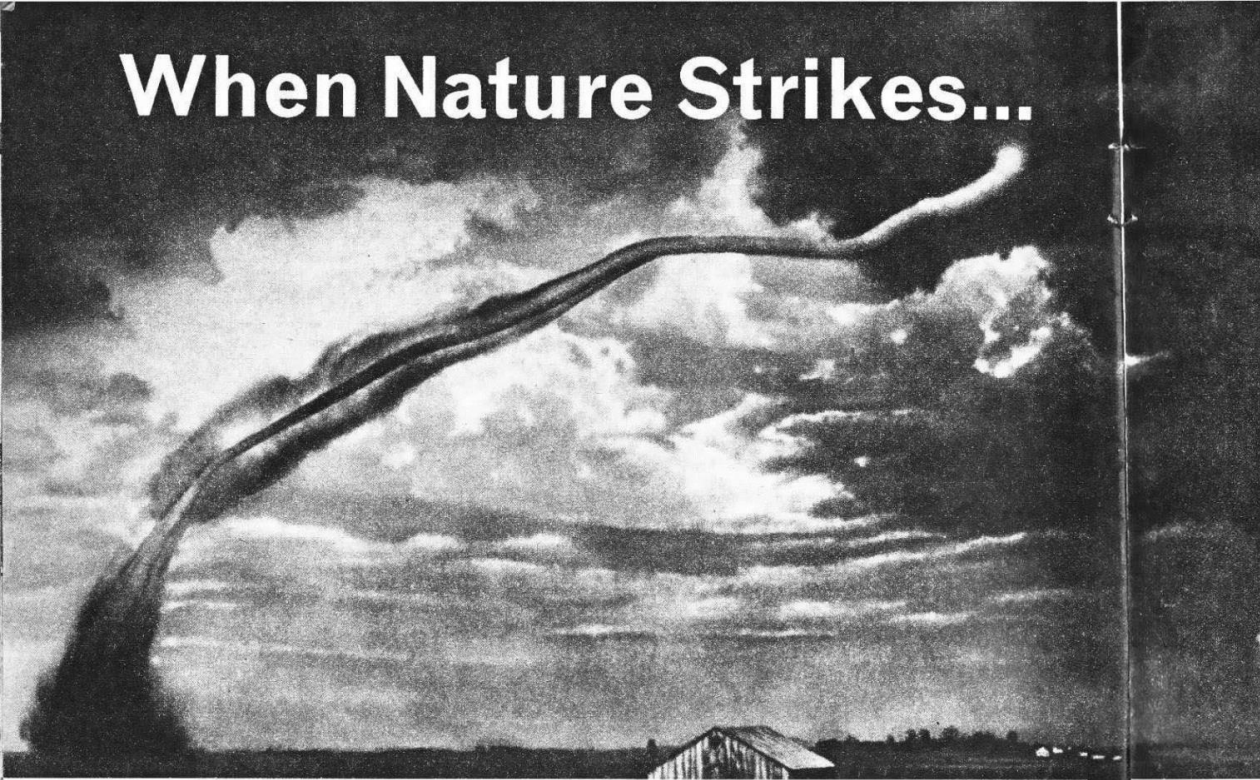
The 'Buccaneer' is a faster than sound strike aircraft in service with the Royal Navy, and even though it is fitted with special air brakes, it is still travelling at about 150 m.p.h. when it touches down on its narrow floating airstrip. In fact, if it were not for the steel cables known as arrestor wires, which are stretched across the deck, the planes would not be able to stop in time and would shoot off into the sea.

These arrestor wires are held some inches above the surface of the deck so that an arrestor hook, which folds down from the tail of the plane, can catch on to them. The wires are close enough to the deck to enable the undercarriage wheels to run over them. They are strong enough to stand the tremendous strain of the first snatch, and attached to powerful springs so that they slow the plane to a standstill in the shortest possible distance. Even so, landing on an aircraft carrier in a rough sea can be a risky business and demands a high degree of skill from the pilots.

Below is a close-up of the massive air-brakes mounted below the tail unit of a Buccaneer. They are in the open position.



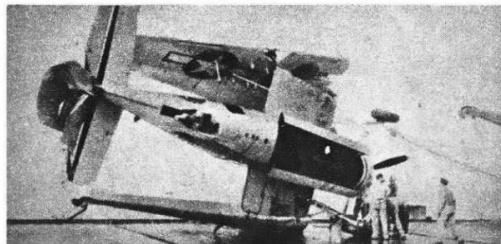
When Nature Strikes...



A tornado—a violent local storm—careers across the countryside.

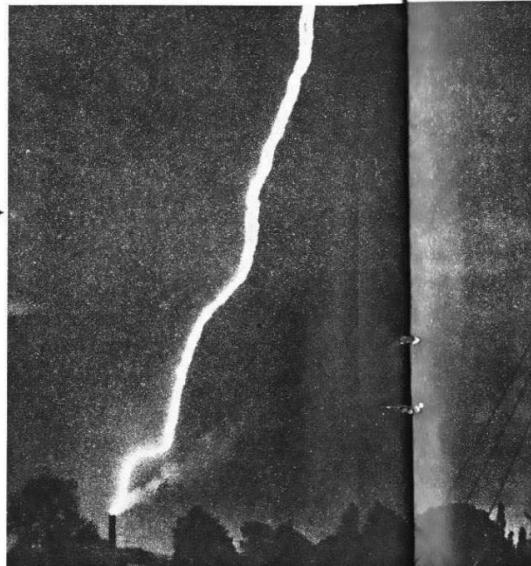


◀ This village in the province of Parma in Italy was completely destroyed by a tornado which struck without warning.



◀ A hurricane hit this American aircraft carrier at sea and this is what happened to one of the planes they could not get away in time!

A dramatic picture of lightning striking a tall chimney. The main flash of lightning always soars upwards into the sky and a big stroke involves millions of volts.



WHEN Nature goes on the rampage she makes even man's mightiest efforts seem like nothing. A one-megaton nuclear explosion, for instance, can be heard 100 miles away. Yet when the Javanese volcano Krakatoa erupted on August 27, 1883, it was heard nearly 3,000 miles away. And when the volcano Tambora let loose in April, 1815, it shot 36 cubic miles of rock debris into the sky. Pressure inside the volcano was estimated to reach 20,000 tons per square inch.

Sometimes violence slams into the earth from outer space. Giant meteoroids—thousands of tons of nickel-iron—blazing a fiery trail through the atmosphere, strike the earth with tremendous fury.

One such meteoroid that struck in the Arizona desert in prehistoric times left a crater three miles in circumference and so deep that you could bury the Houses of Parliament in it twice over.

Even the air we breathe is alive with potential violence. When wild winds sweep across the face of the earth immense energies are released. In one day a large hurricane releases as much energy as a nuclear bomb.

When winds are blowing at 150 m.p.h.—a speed frequently reached in hurricanes—every square foot of surface is hit with blows of some 60 pounds. Trees fall, buildings collapse, cars are swept off the roads and ships are sunk.

With the wind comes the rain. An inch of rain in 24 hours is heavy rainfall. In hurricanes an inch sometimes falls each hour. Blinding sheets of near-horizontal rain sweep across the country and often the sea rises to complete the watery devastation. Incidentally, the world record rainfall is just over six feet in 24 hours!

We have all seen the air set alight by lightning's tremendous electrical discharges. A big stroke involves millions of volts.

It has been estimated that one four-hundredth of the total energy released in a lightning flash goes into the production of thunder. In actual figures this means that there is 30 million horsepower behind some rolls of thunder.

No wonder, then, that the compression waves from thunder sometimes shatter windows and their frames and knock men and animals off their feet!

The pictures on these two pages have been chosen from more than 80 illustrations which appear in *The Elements Rage* by Frank W. Lane, to be published later this year.

Below: The Saada Hotel in North Africa—and, below right, what was left of it after it had been hit by an earthquake.



The people of Japan have suffered many earthquakes. Here, a department store leans drunkenly in a city after a severe earth tremor.



Like an oversized jet plane trail, a tornado rips across open country in America, leaving death and destruction in its wake.

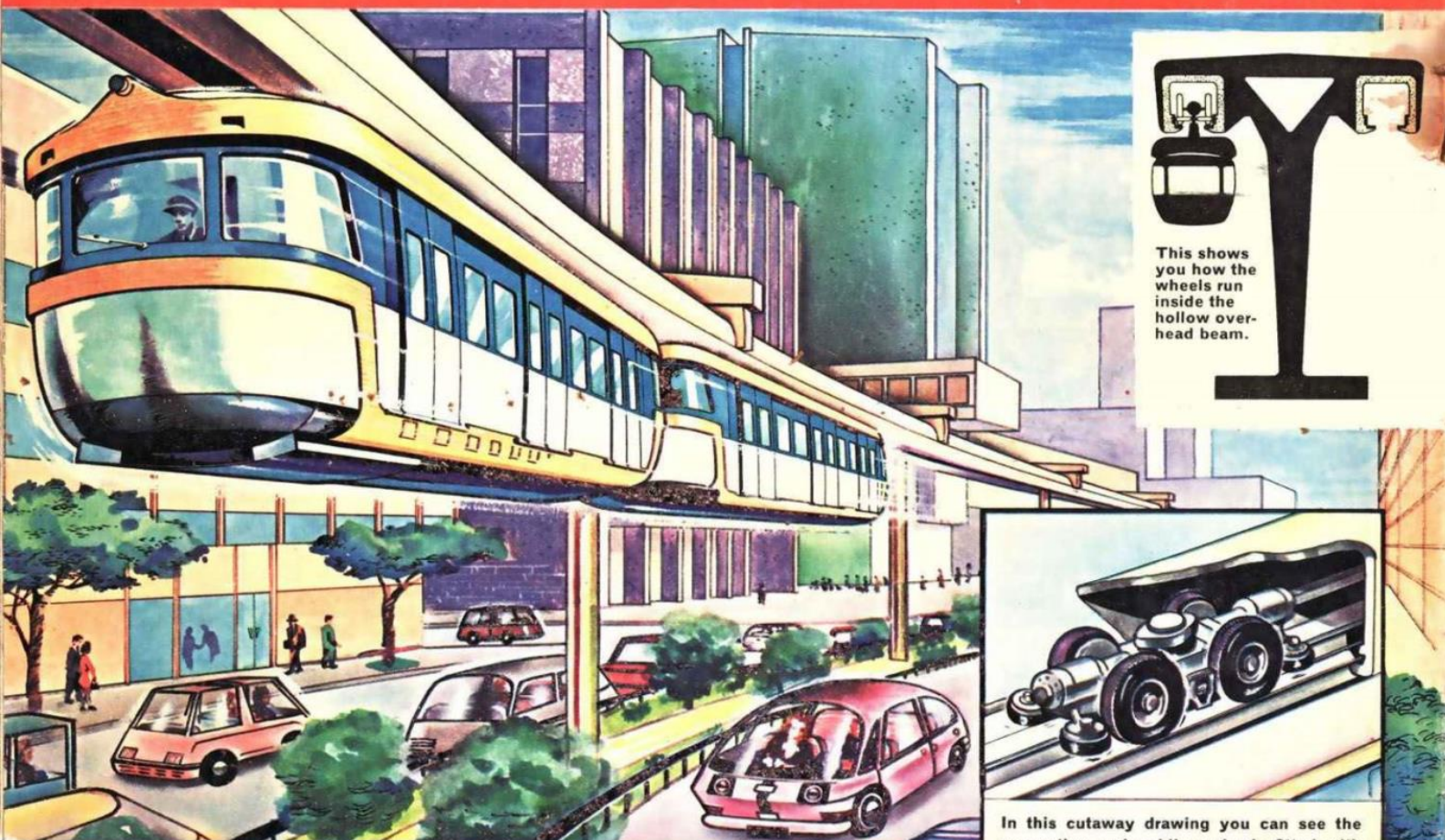


This plane looks as if it has been shot down by anti-aircraft fire. In fact, huge hailstones battered it while it was on the ground.



RAILWAY DAYS AND WAYS

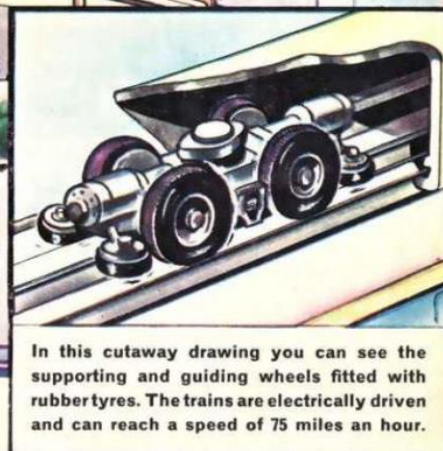
By TV personality and
railway enthusiast
DAVID NIXON



FRANCE TRIES A NEW MONORAIL

LAST week I told you how traffic congestion on roads in and out of big American cities was being increased by people travelling to and from airports, and how town planners were considering overhead monorails to help ease the traffic jams. Now I thought you might like to see how the French are thinking of tackling

the problem. This French-designed monorail is a suspended type and hangs beneath the overhead rail, unlike the American one which runs along the top. So far only a short test track has been built near Orleans. It has proved that the system would be safe, fast, quiet and comfortable. The pylons which support the



In this cutaway drawing you can see the supporting and guiding wheels fitted with rubber tyres. The trains are electrically driven and can reach a speed of 75 miles an hour.

track take up very little room on the ground and the cost is only one-third the cost of building an underground tube railway. A monorail like the one above was suggested for linking London Airport with the city.



A LITTLE LOCOMOTIVE BUILT FOR SHARP CURVES AND LONG CLIMBS

HERE is a little loco which I think is great fun. It may look as though it doesn't know whether it is coming or going, but there is a good reason for the double boiler which spreads the weight equally over the bogies. It is one of the famous 'Fairlie' engines of the Festiniog Railway which starts at Portmadoc in North Wales.

The first of these little chaps was

built for this 1 ft. 11½ in. gauge railway in the railway company's own workshops at Boston Lodge in 1879, and since then this type of locomotive has been used by mountain railways in many other parts of the world.

Our artist has drawn the Earl of Merioneth, which was built in 1885. At 81 years of age this must be one of the oldest locomotives in the world

still in regular service.

The tiny wheels (2 ft. 8 in. diameter) will take a 5-bogie coach train loaded with 200 passengers up the 1 in 70 incline at 15 m.p.h. and when she's in a hurry on the flat, she will do over 30 m.p.h.

The coaches, by the way, are very modern and the only ones which use 'louvred' windows for ventilation.



RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

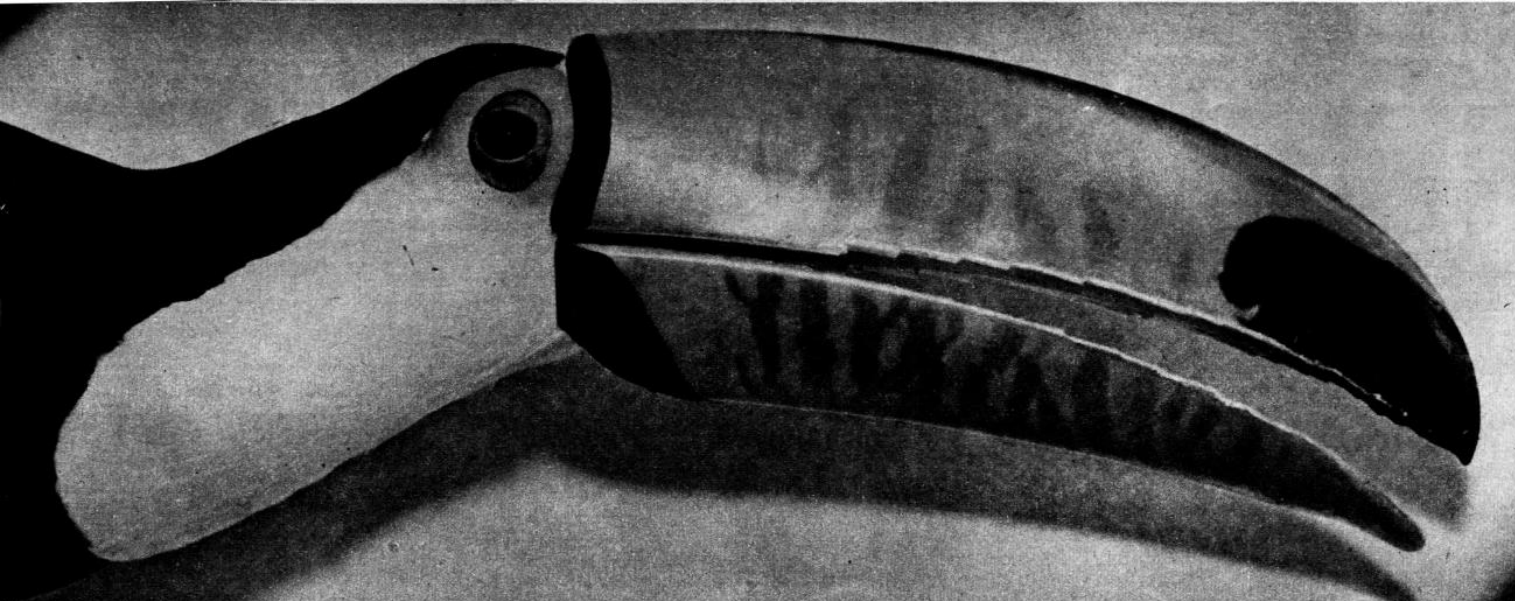
ONE SHILLING



**HE'S WALKING
ON TOP OF
THE WORLD!**

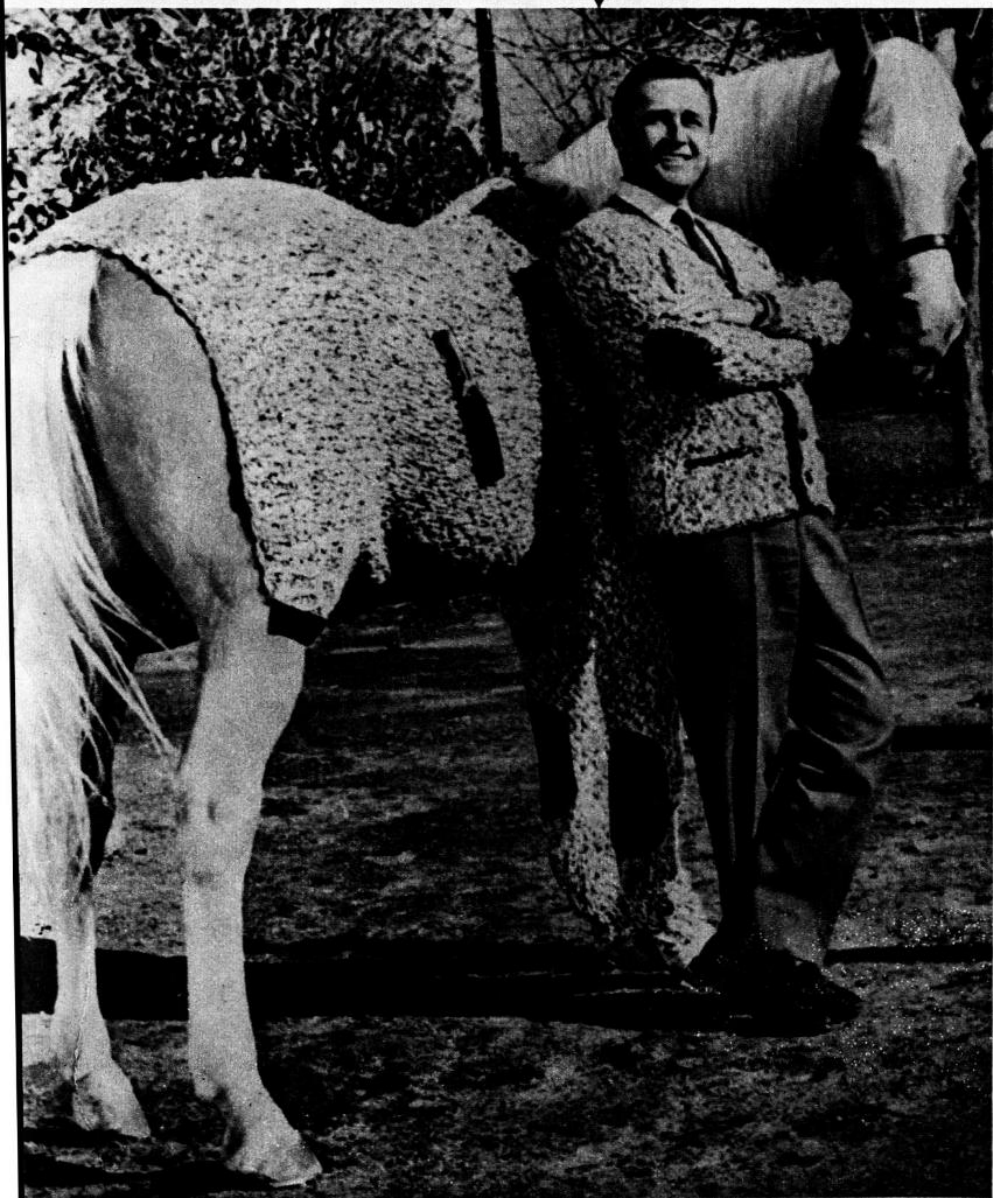
See pages 6 and 7

FEB · 12 · 1966



▲ I expect most of you recognised this bird as a toucan, but could you say what colour its beak is? It is, in fact, a bright orange with a black spot at the tip, and it is eight inches long!

How's this for a fashion hint? American actor Alan Young gave his horse a sweater to match his own. Both take part in the "Mr. Ed" talking horse TV series. The horse said, "Thanks," of course!

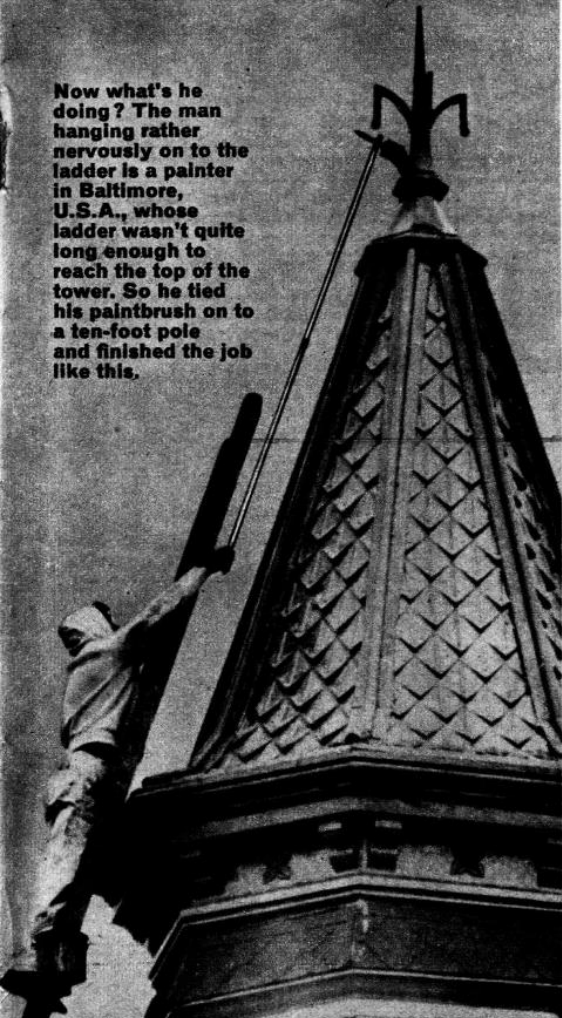


YOUR WORLD TODAY

RANGER'S roving cameramen report from America, Britain and North Korea . . .



Now what's he doing? The man hanging rather nervously on to the ladder is a painter in Baltimore, U.S.A., whose ladder wasn't quite long enough to reach the top of the tower. So he tied his paintbrush on to a ten-foot pole and finished the job like this.



Even his best friends probably would not recognise this mud-spattered motor cyclist! His name is Ken Dodd and he was taking part in a 'scramble' at Jewel's Hill, Kent.

This amazing crowd picture was taken at the climax of a Sports Festival in North Korea. Over 41,000 students gave a mass gymnastic display.



**You can laugh—
but it's TRUE!**



Police in Chippenham, Wiltshire, were astonished when they were told that six of the new Continental-style road signs erected in their area were upside-down! They were even more amazed when they found the person who discovered them. He was Andrew Wicks, who lives in Malmesbury Road, Chippenham, and Andrew is only eight years old. The police congratulated Andrew and workmen were sent out to put things right.

★ ★ ★

The organist of a church at Binstead in the Isle of Wight could not understand why the instrument kept making peculiar noises and going out of tune. Then he discovered that a stray cat had been taking a short cut through the church and walking across the organ pipes!

1



The MAN WHO

THESE fantastic pictures of American astronaut Edward White walking in space were taken last year when he and his co-pilot, Major James McDivitt, were rocketed into orbit in a Gemini spacecraft.

It was the first time the Americans had attempted a space walk and it was done as part of the long series of experiments which will eventually lead to man's first trip to the Moon.

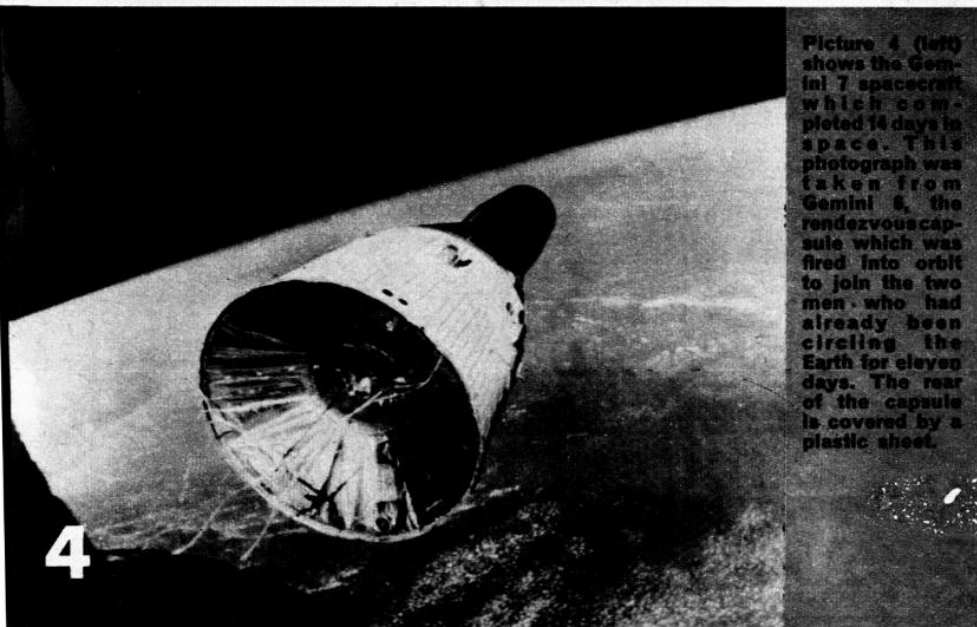
Almost every second of the twenty minutes which Edward White spent outside the protective shell of his capsule was filled with danger. His life depended entirely on his space suit and the special equipment he carried. A gold-plated lifeline carrying oxygen and telephone lines connected him to the spacecraft. Had the oxygen supply failed he could have switched over to an emergency pack on his chest.

The visor on his helmet was tinted to reduce the blinding glare of the sun, and his suit had ten extra layers of material added to it to protect him from the extremes of temperature in outer space which vary between 250° F in the full heat of the sun, to 150° below zero in the shadow of the capsule.

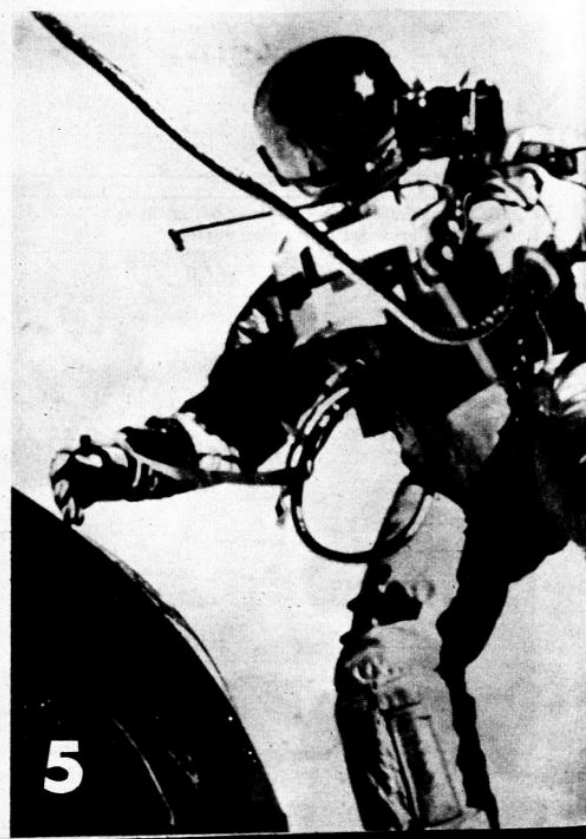
The suit also had to protect him from cosmic radiation and from the possibility of bombardment by tiny meteorites which hurtle through space like high-velocity rifle bullets. If one had punctured his pressurized suit he would have exploded like a balloon in the vacuum of space.

During his walk 125 miles up, Edward White moved about by means of a special compressed air gun. In picture 5 you can see the two nozzles at either end of a tube which he held in front of him. There is also a camera strapped to it.

Pictures 1, 2, and 3 show him carrying out manoeuvres as he floats with the world at his feet. The dark object close to the open hatch of the Gemini capsule is a pouch which contained the coiled lifeline. Near the bottom righthand corner of picture 3 is the shadow of the cine camera which Major McDivitt used to take the pictures. In pictures 6 and 7 the lifeline uncoils and floats weightlessly round the astronaut.



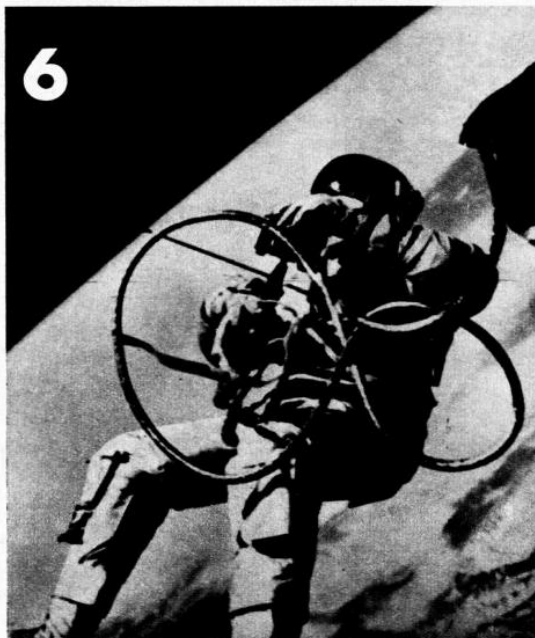
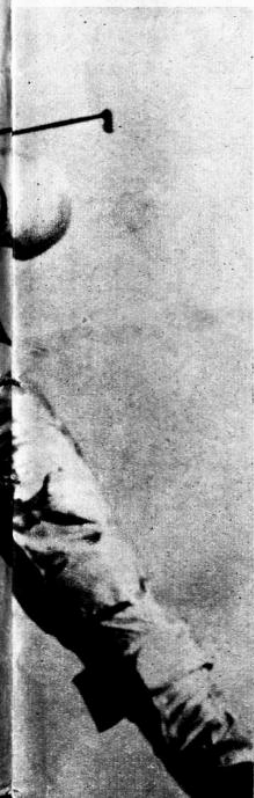
Picture 4 (left) shows the Gemini 7 spacecraft which completed 14 days in space. This photograph was taken from Gemini 6, the rendezvous capsule which was fired into orbit to join the two men who had already been circling the Earth for eleven days. The rear of the capsule is covered by a plastic sheet.



4

5

WALKED IN SPACE



Now turn to page 20 for a special Looking Into Things on the Gemini space capsule.



Inside the Gemini Capsule

THIS week, RANGER'S Science Reporter takes you into orbit with the astronauts of Gemini 7, the two-man American space capsule. This is the space vehicle in which Frank Borman and James Lovell spent 14 days hurtling round the Earth at a speed of 17,500 m.p.h. They completed 206 orbits in their cramped cockpit and made history by linking up with another Gemini capsule 185 miles above the Earth's surface.

The Gemini craft actually consists of three separate sections. The most important of these is the re-entry section which houses the two pilots. The other two sections behind them contain equipment necessary to keep them in space for a prolonged period.

Not only do astronauts have to be physically tough and fit, they also have to be above average intelligence—they are, in fact, supermen. During launching, the tremendous thrust of the giant Titan rocket forces them down into the special reclining seats so that they can barely move. Then, after the complete weightlessness of space, they have to suffer the enormous pressures of rapid deceleration as they re-enter the atmosphere.

Now study the cutaway drawing and read the key to the numbers at the foot of the page.

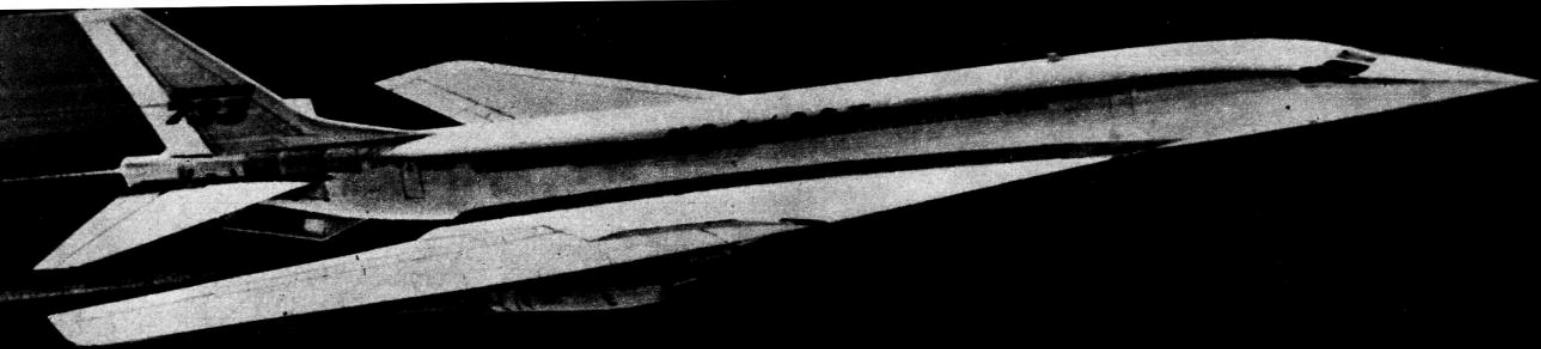


HERE is a close-up picture of the interior of a Gemini space capsule. It is the view you would have if you were sitting alongside the co-pilot during a trip into space. Both astronauts are surrounded by a mass of switches, dials and control levers, which operate computers, guidance rockets, radio and radar systems and a whole host of other complicated equipment.



THE three sections or modules of the Gemini spacecraft can be separated by the pilot when the time comes for him to return to Earth. Only the forward cone-shaped section returns—the rest is left to burn up in the Earth's atmosphere. Before re-entry the pilot turns the craft round, blunt end first, and then fires the retro-rockets.

1. Cabin or re-entry module.
2. Retrograde module.
3. Equipment module.
4. Rendezvous radar.
5. Parachute landing equipment.
6. Machinery controlling the angle or attitude of the capsule as it re-enters the Earth's atmosphere.
7. Observation port.
8. Ejector seats.
9. Retrograde rockets for returning to Earth.
10. Coolant radiators to cool capsule while travelling through Earth's atmosphere.
11. Radio equipment.
12. Fuel tanks.
13. Thrust rockets to control attitude of capsule while in orbit.
14. Coolant pumps.
15. Oxygen tank.
16. Drinking water.
17. Electrical power system.
18. Manoeuvre thrusters for controlling direction.
19. Electrical equipment.
20. Instrument panel.



**INTO
THE
BLUE**

SUPERSONIC SWING-WING



LEFT: is an artist's impression of the huge new Boeing 733 supersonic swing-wing airliner with its wings in the high-speed position. Its four turbo-jet engines will take it to 65,000 feet and boost it through the sound barrier to a speed of 1,800 m.p.h.

RIGHT: a picture of the cockpit. This is a full-size 'mock-up' of the real thing but the view through the windscreen is actually only an enlarged photograph of an airport to enable pilots to see the view they will get as they land the 733.

AIRLINER

Edited by
test pilot
NEVILLE DUKE

ONE of the many problems of building large airliners which can fly faster than the speed of sound is designing a wing whose shape offers the least resistance to the tremendous air pressures of high-speed flight, but which will at the same time give enough 'lift' to the aircraft when it is travelling at the lower speeds needed for landing and take-off.

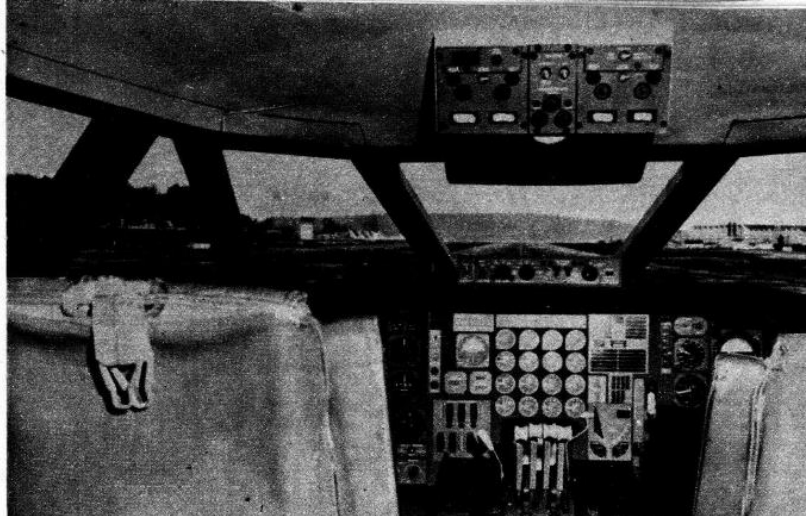
A way of solving this was suggested some time ago by the British inventor, Dr. Barnes Wallis, but it is the Americans who made the first practical use of the idea in the F.111 military aircraft and are now using it in their new Boeing 733 supersonic airliner.

Britain and France are ahead of the Americans in the building of the 'Concorde' supersonic airliner, but the Boeing Company's machine will be larger and with a top speed of 1,800 m.p.h. may be slightly faster.

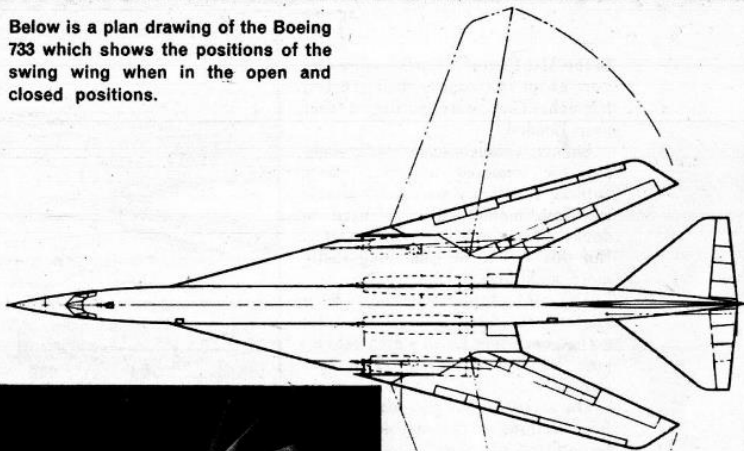
On these pages you can see some of the elaborate preparation which goes into the job of producing such an aircraft. The big picture on the left shows a top view of the one-fifth scale model which has been built for wind tunnel testing. It is made of steel, fibre glass, wood and aluminium, and although only a non-flying model, it is larger than many aircraft in use at the present time.

The length of the model is 54 ft. 2 ins. and the wings which are hinged about half-way along their length, have a span of 33 ft. 10 ins. when they are in the outward position (the position for take-off and landing in the final full size machine) and 19 ft. 8 ins. when they are in the streamlined arrow position.

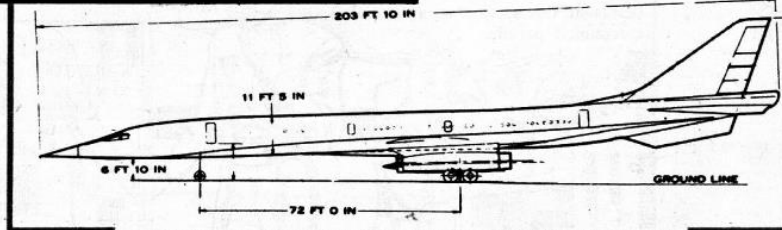
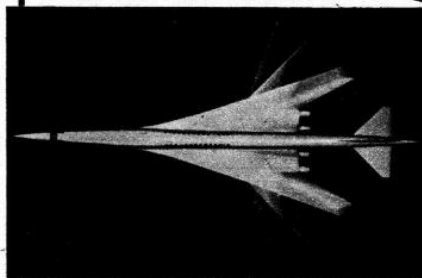
Six 40 ft. diameter fans driven by six 6,000 h.p. electric motors produce the high wind speeds in the test tunnel and special measuring instruments show the flight engineers exactly what happens when these winds strike the model so that the best possible shape of wing and fuselage can be found.



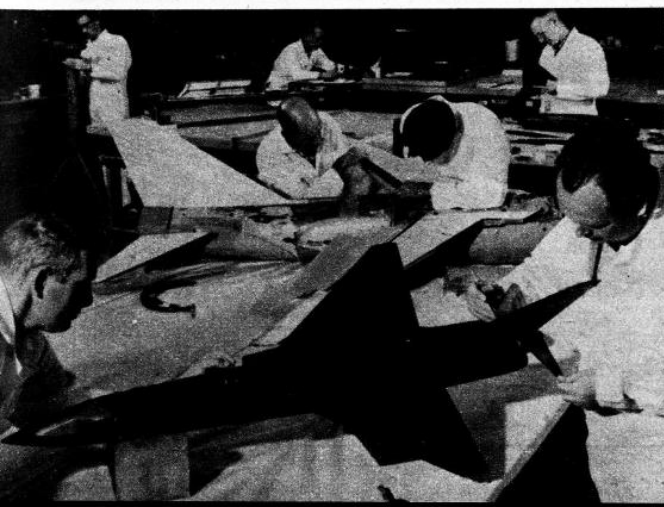
Below is a plan drawing of the Boeing 733 which shows the positions of the swing wing when in the open and closed positions.



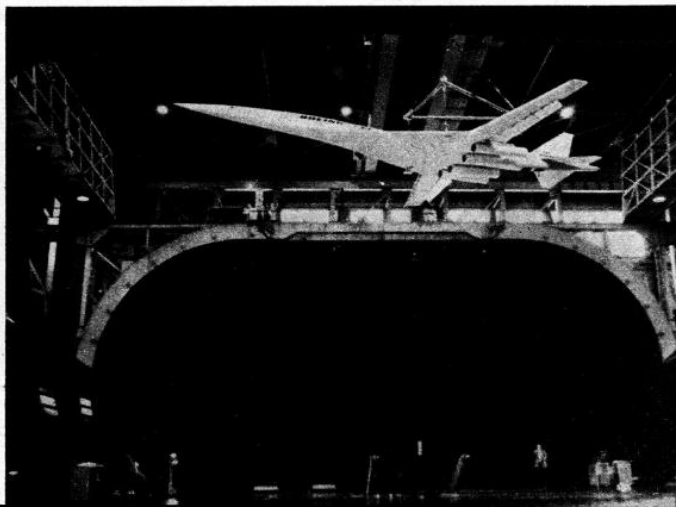
The black panel (left) shows how the pilot can vary the position of the wing between open and closed.



Above is a side view of the Boeing 733. It is designed to carry up to 227 passengers.



Many different models of varying sizes are made by expert craftsmen. They are usually one-tenth scale and some are actually dropped from 40,000 feet with instruments on board which radio back what happens to them before they strike the ground. On the right you see the large-scale model suspended from the top of the giant wind tunnel.



JAMES BOND'S FANTASTIC CAR!

**SEE PAGES 6 and 7
AND BACK COVER**

RANGER

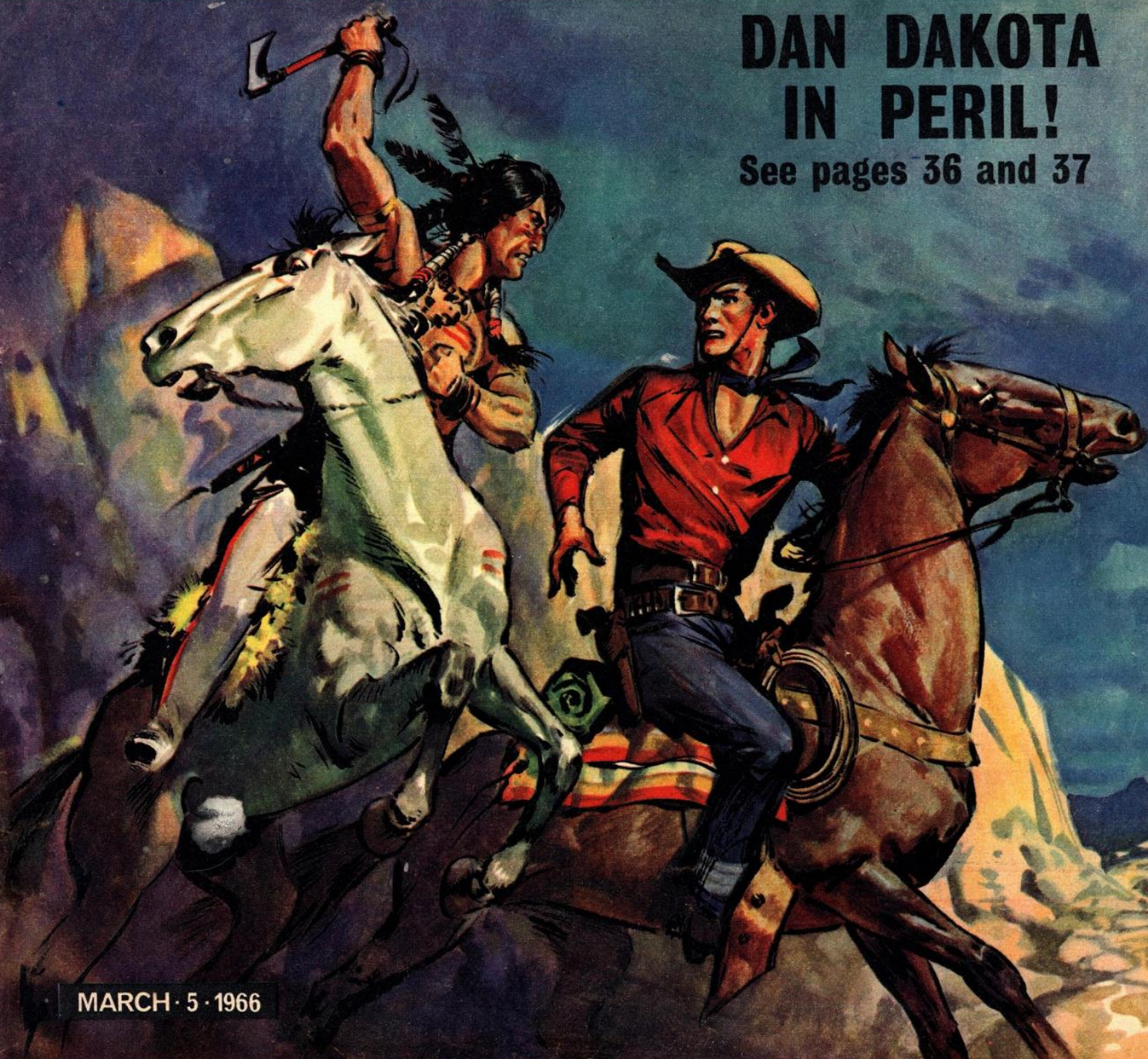
THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

ONE SHILLING

**DAN DAKOTA
IN PERIL!**

See pages 36 and 37



MARCH · 5 · 1966



Your WORLD TODAY

◀ Open wide please! Nicky, the hippopotamus at Manchester's Belle Vue Zoo, had his keeper worried when a seven-inch-long tusk tooth was found on the bottom of his pool. That's the tooth in the keeper's right hand, but how Nicky came to lose it nobody could discover. However, as hippos are vegetarians, the loss of the tooth was not very important, and anyway, Nicky has most of his food given him ready to eat.

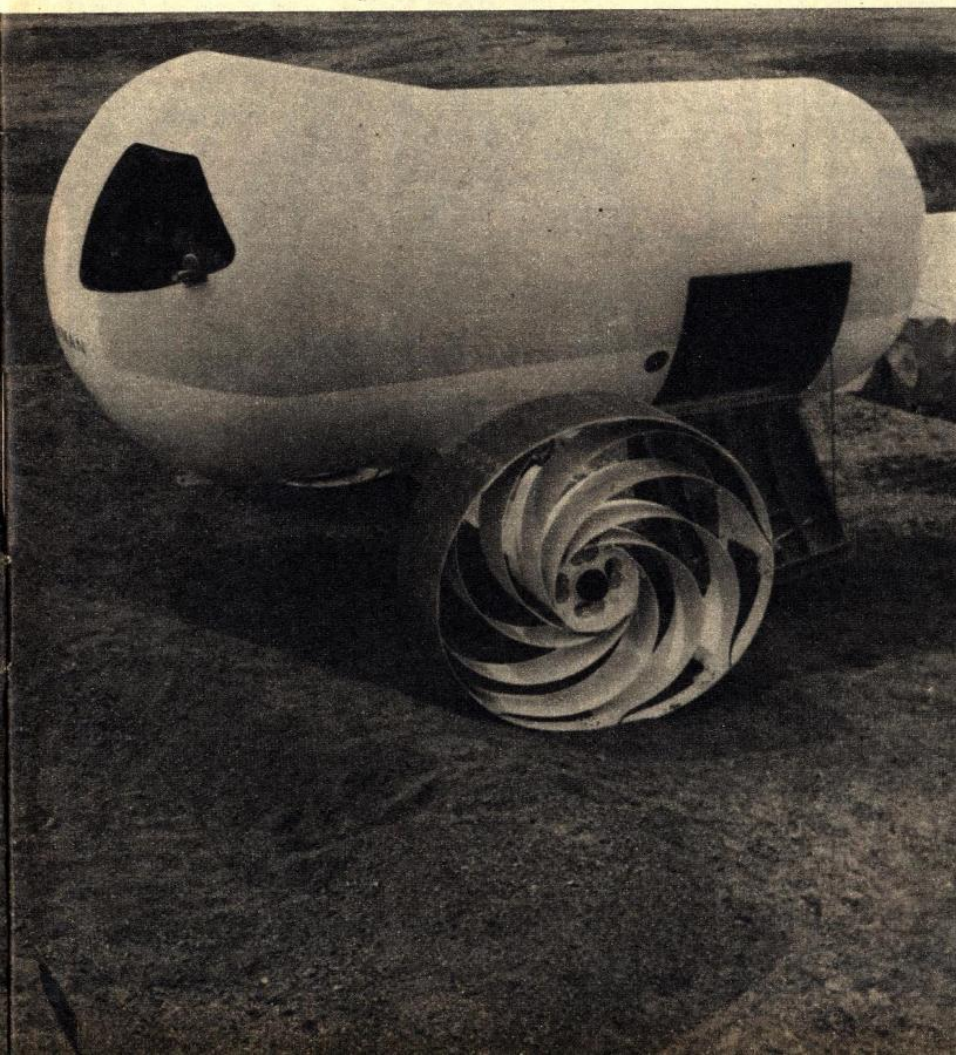


"Pardon be, but I habn't got a code id by nose—I just don't like getting my nose in the code!" This man lives in Manitoba, Canada, where the temperature dropped to 40 deg. below zero this winter and to prevent him getting the end of his nose frost-bitten he bought himself a nose-muffler.



Winter can be a grim business even in sunny California. The motorist standing on the boot of his car was trapped in a torrent of water in a suburb of Los Angeles. A driving rainstorm brought four inches of rain in less than an hour and turned roads into rivers. A towing truck managed to pull the car clear before it was washed away.

This fantastic-looking vehicle is a scaled down model of a moon exploration vehicle. Made by the Grumman Aircraft Company of America, it has special wheels which are designed to deal with the expected soft, dusty surface on the planet. It travels at about 5 m.p.h. and a special test area complete with craters has been made out of cinders and coal dust to find out how efficient it would be on the moon.



You can laugh, but it's true!

A local police station in New York received a report that a gaping hole had appeared in a nearby canal bridge. Patrolman Stanley Cwanlinski was sent to find out if the report were true. It was—the patrolman and his car went straight through it!

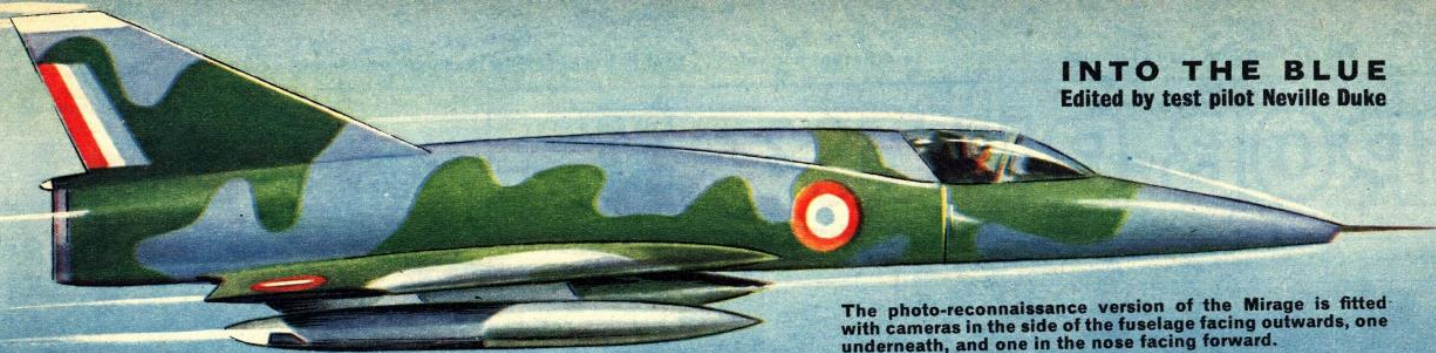


Mrs. Emma Heinemann of Ascot, Berkshire, sent for the police when she found the lounge of her home in chaos. Ornaments had been broken, flower pots thrown on to the floor and furniture scratched. But the mystery was how did the intruder get into her house? All the doors and windows were closed when Mrs. Heinemann left to go out and were still closed when she returned. Police searched the house and found nothing until an officer moved a settee in the lounge. Behind it was a rather scared wild squirrel which had been searching for nuts.



INTO THE BLUE

Edited by test pilot Neville Duke



The photo-reconnaissance version of the Mirage is fitted with cameras in the side of the fuselage facing outwards, one underneath, and one in the nose facing forward.

THE FASTEST IN FRANCE

SUCH tremendous strides have been made in the design and construction of modern military aircraft that nowadays many fighters and bombers have virtually the same performance.

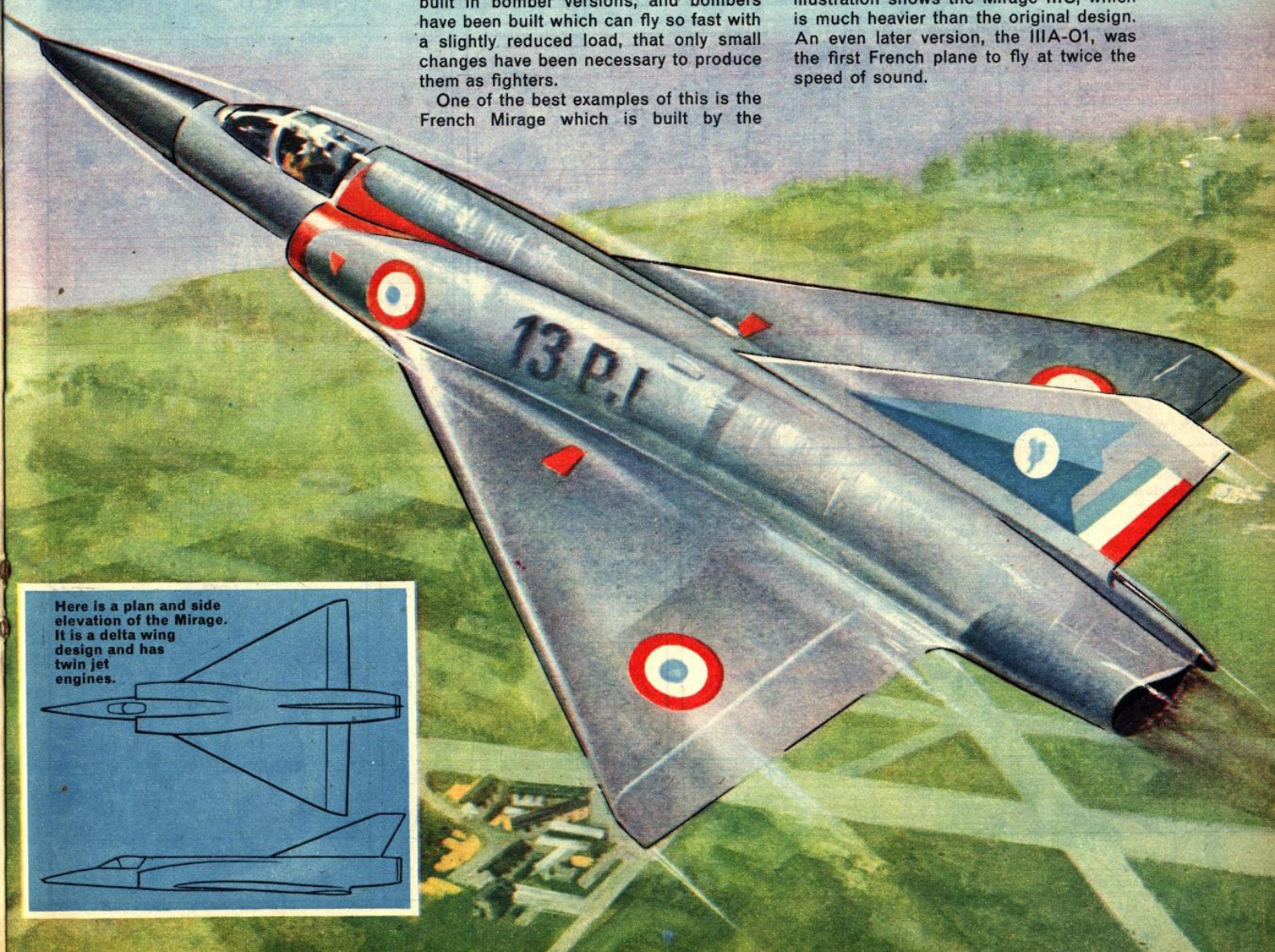
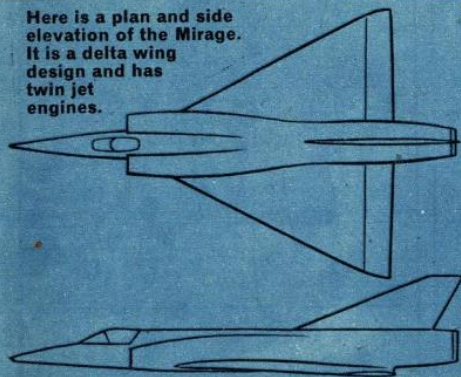
In some cases, planes which were designed as fighters can carry heavy loads so far and so fast that they have been built in bomber versions, and bombers have been built which can fly so fast with a slightly reduced load, that only small changes have been necessary to produce them as fighters.

One of the best examples of this is the French Mirage which is built by the

Dassault company. The Mirage I was Marcel Dassault's design for an interceptor fighter. Its wing span was only 24 feet, and in a shallow dive it was hardly much faster than the speed of sound.

But constant development over the last 10 years has resulted in numerous versions, from jet trainers to strike aircraft. Our illustration shows the Mirage IIIC, which is much heavier than the original design. An even later version, the IIIA-O1, was the first French plane to fly at twice the speed of sound.

Here is a plan and side elevation of the Mirage. It is a delta wing design and has twin jet engines.

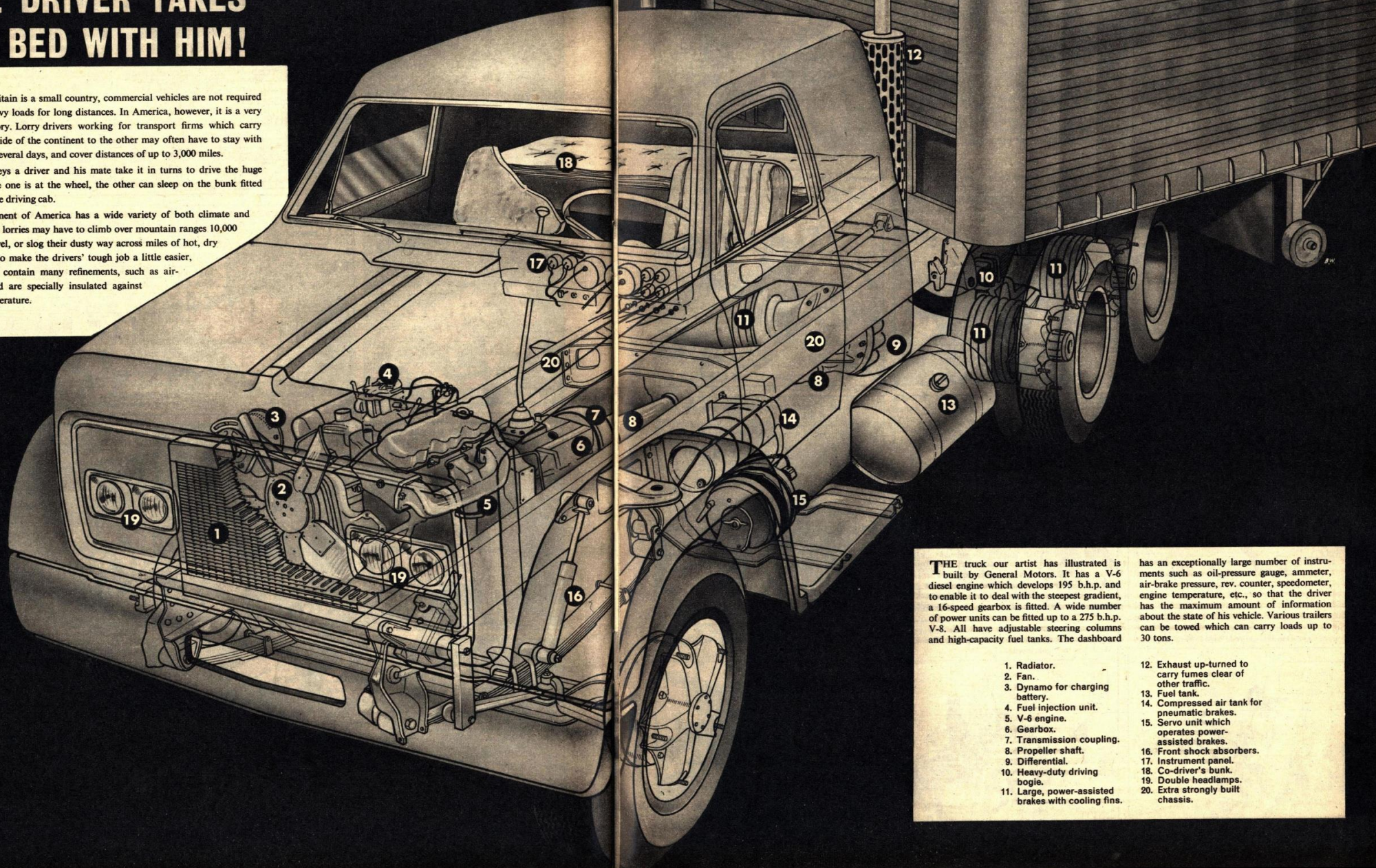


THE DRIVER TAKES HIS BED WITH HIM!

BECAUSE Britain is a small country, commercial vehicles are not required to carry heavy loads for long distances. In America, however, it is a very different story. Lorry drivers working for transport firms which carry goods from one side of the continent to the other may often have to stay with their vehicle for several days, and cover distances of up to 3,000 miles.

On such journeys a driver and his mate take it in turns to drive the huge lorries, and while one is at the wheel, the other can sleep on the bunk fitted into the rear of the driving cab.

The vast continent of America has a wide variety of both climate and terrain, and these lorries may have to climb over mountain ranges 10,000 feet above sea level, or slog their dusty way across miles of hot, dry desert. In order to make the drivers' tough job a little easier, the driving cabs contain many refinements, such as air-conditioning, and are specially insulated against extremes of temperature.



THE truck our artist has illustrated is built by General Motors. It has a V-6 diesel engine which develops 195 b.h.p. and to enable it to deal with the steepest gradient, a 16-speed gearbox is fitted. A wide number of power units can be fitted up to a 275 b.h.p. V-8. All have adjustable steering columns and high-capacity fuel tanks. The dashboard

has an exceptionally large number of instruments such as oil-pressure gauge, ammeter, air-brake pressure, rev. counter, speedometer, engine temperature, etc., so that the driver has the maximum amount of information about the state of his vehicle. Various trailers can be towed which can carry loads up to 30 tons.

1. Radiator.
2. Fan.
3. Dynamo for charging battery.
4. Fuel injection unit.
5. V-6 engine.
6. Gearbox.
7. Transmission coupling.
8. Propeller shaft.
9. Differential.
10. Heavy-duty driving bogie.
11. Large, power-assisted brakes with cooling fins.
12. Exhaust up-turned to carry fumes clear of other traffic.
13. Fuel tank.
14. Compressed air tank for pneumatic brakes.
15. Servo unit which operates power-assisted brakes.
16. Front shock absorbers.
17. Instrument panel.
18. Co-driver's bunk.
19. Double headlamps.
20. Extra strongly built chassis.

RANGER

THE NATIONAL BOYS' MAGAZINE

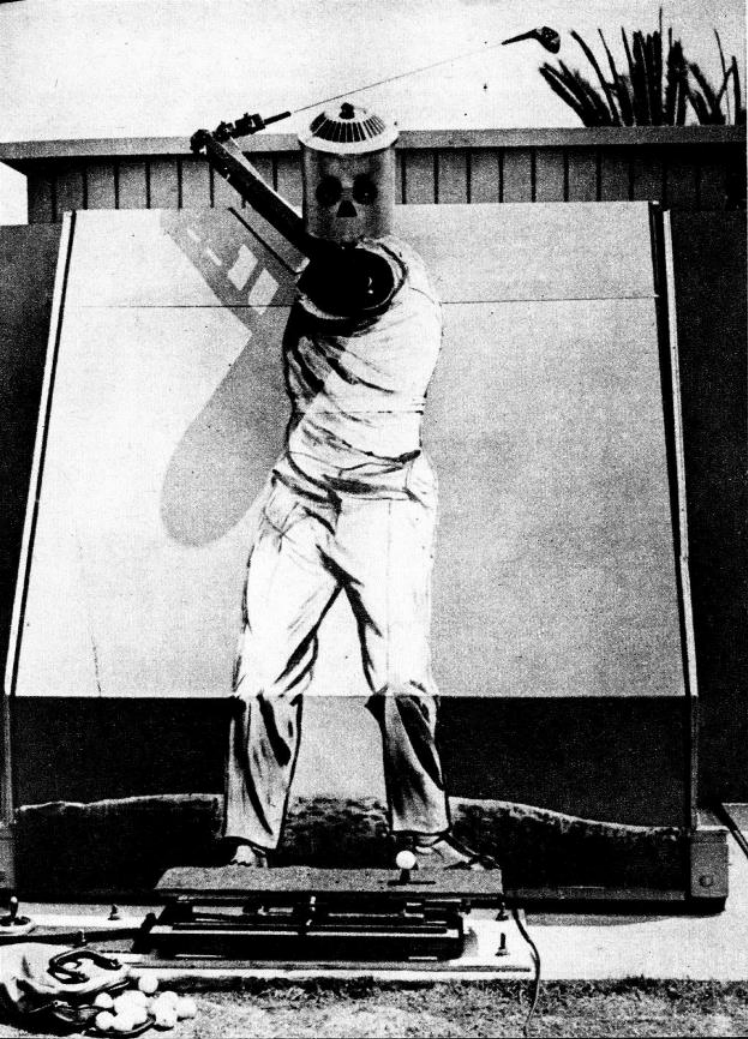
EVERY MONDAY

PRICE 1/3

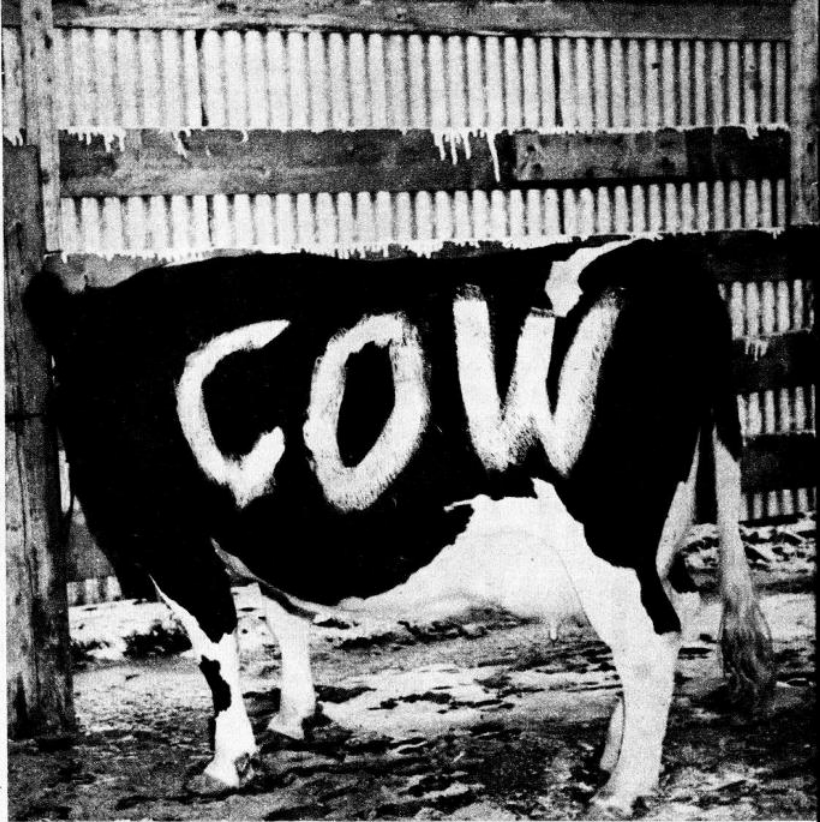
**TRAIN THAT DOWNED
A PLANE** *See page 39*



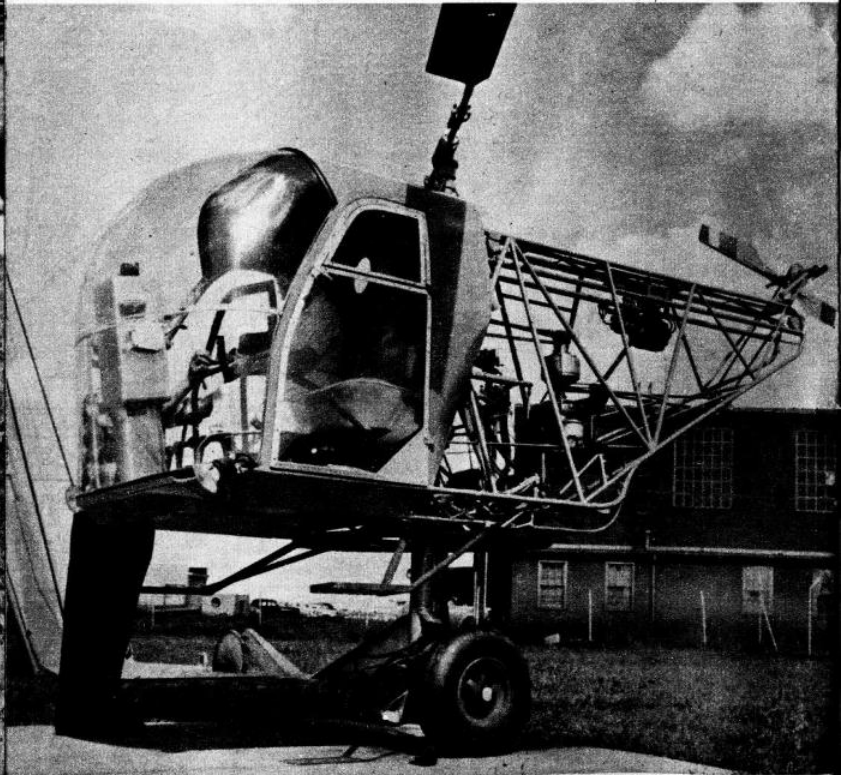
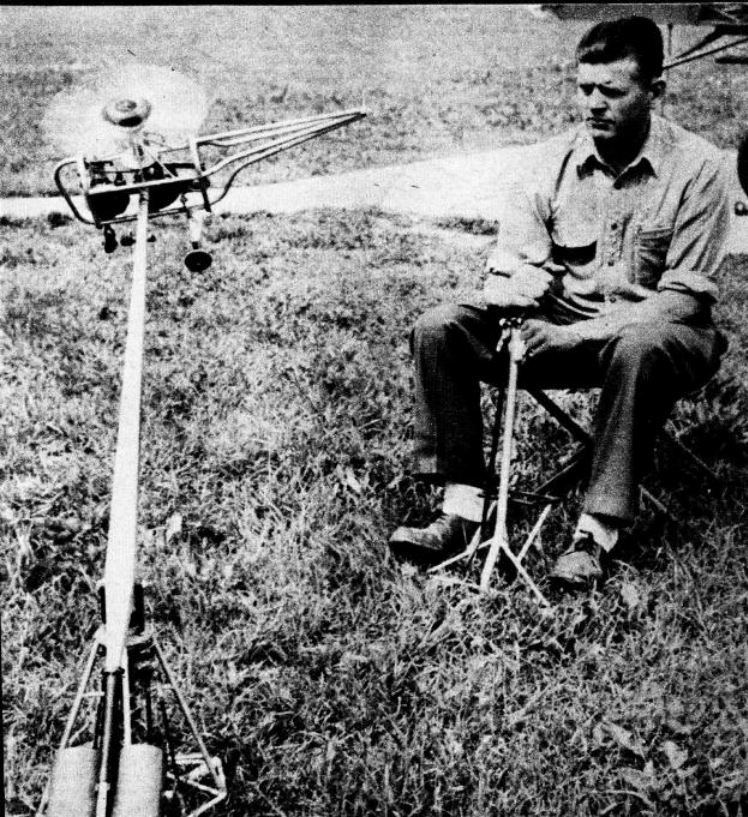
MARCH 12 1966



▲ No—the Daleks have not taken up golf! This metal monster has been designed by an American missile expert. It will swing clubs of various weights so that golfers can be scientifically fitted with clubs of the correct size. It can hit a ball 325 yards with great accuracy.



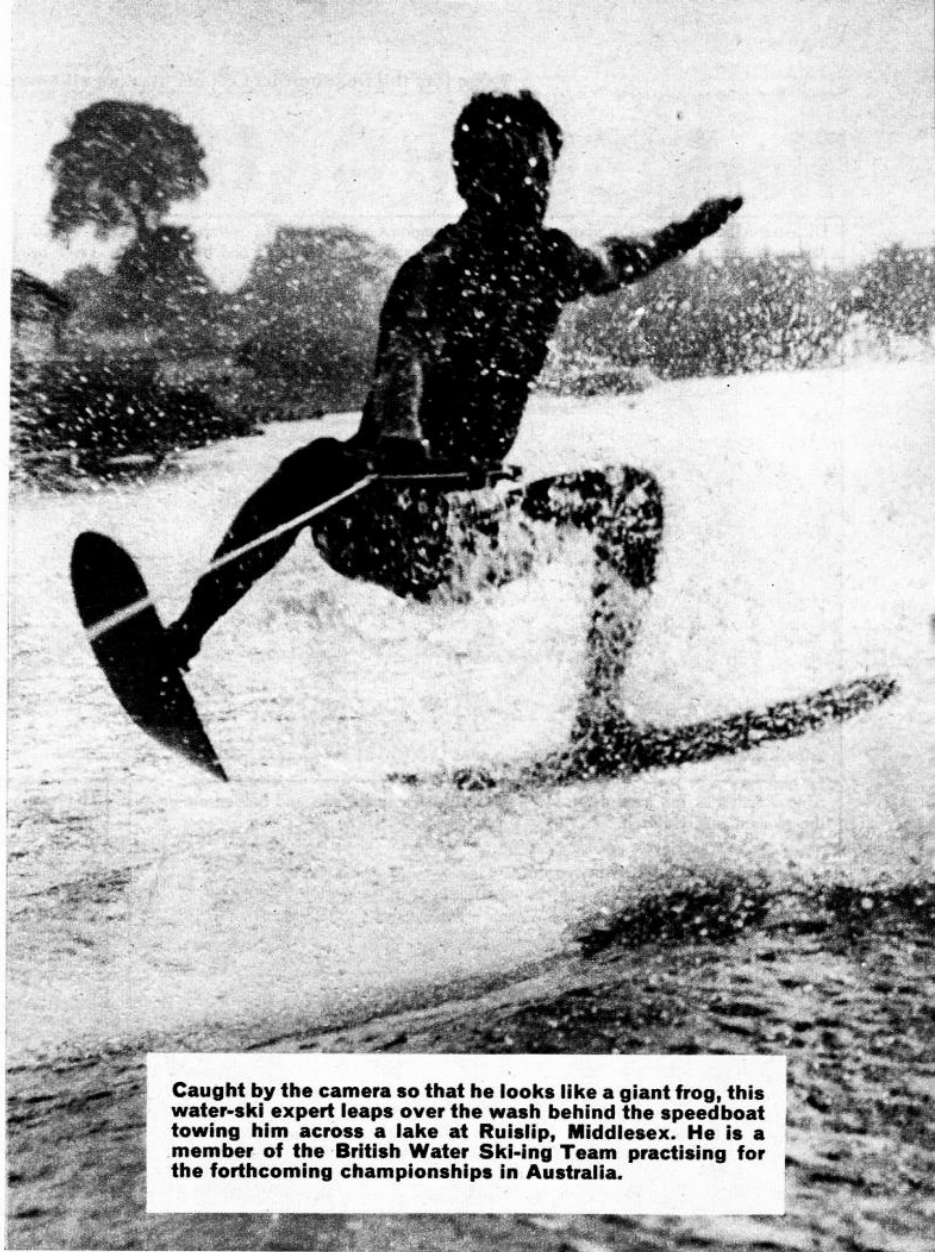
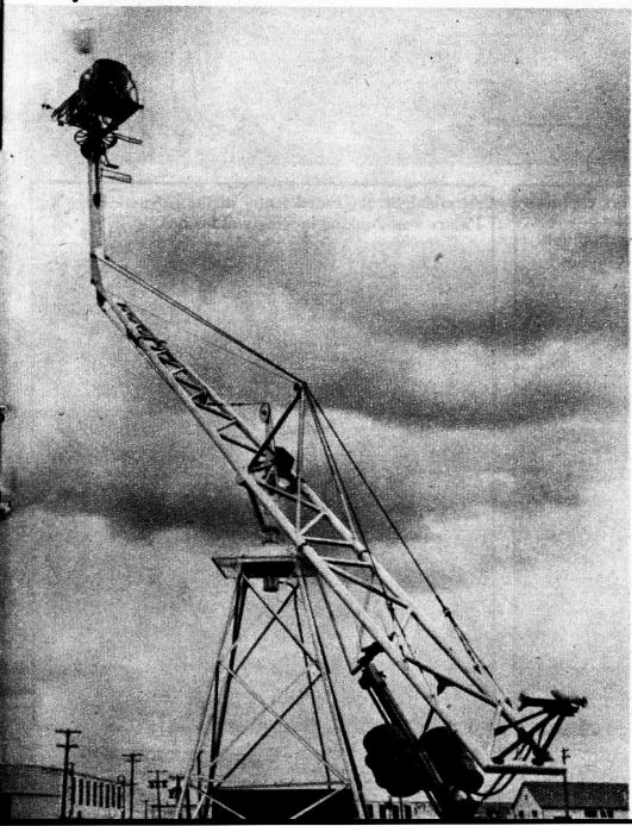
YOUR WORLD TODAY





▲ A farmer in Alpena, Michigan, U.S.A., is taking no chances with his animals. He heard rumours that deer hunters invading his area had never seen a deer, so to make sure they didn't mistake his dairy herd for deer he did a spot of painting!

Peter Jacobs of Edmonton, Canada, has invented a trainer-helicopter which can soar up to a height of 76 feet and carry out every kind of manoeuvre without leaving the airfield. Training helicopter pilots can be expensive, but his electrically driven machine with counter-balance weights is cheap to run, and is quite effective for the first 20 hours of training. The bottom left-hand picture shows Peter demonstrating a model of the 'Jaycopter' as he calls his invention. Centre is a close-up of the cockpit and below, right, shows how high it can go on the end of its tether.



Caught by the camera so that he looks like a giant frog, this water-ski expert leaps over the wash behind the speedboat towing him across a lake at Ruislip, Middlesex. He is a member of the British Water Skiing Team practising for the forthcoming championships in Australia.

YOU CAN LAUGH— BUT IT'S TRUE!

A CAR owner living in Exeter, Devon, forgot he had asked his 15-year-old son to put a cover over the engine of his car during the cold weather. He drove off, and when his car stalled in the middle of traffic he opened the bonnet to find his own tweed overcoat jammed in the fan belt!



Freddy, a baby elephant, who lives in Flamingo Park's Winter Zoo, at Newcastle-on-Tyne, has a tremendous appetite. If he sees anything which seems eatable—he has a go! Recently Freddy chomped his way through a large piece of cardboard. It was the sign outside his enclosure and on it were the words: "Please don't feed the elephant."

INTO THE BLUE

Edited by test pilot
NEVILLE DUKE

LOOK NO

For centuries man has
been trying to go up
without wings... even James

SINCE earliest times men have envied the birds their power of flight and have tried to copy them—often with disastrous results.

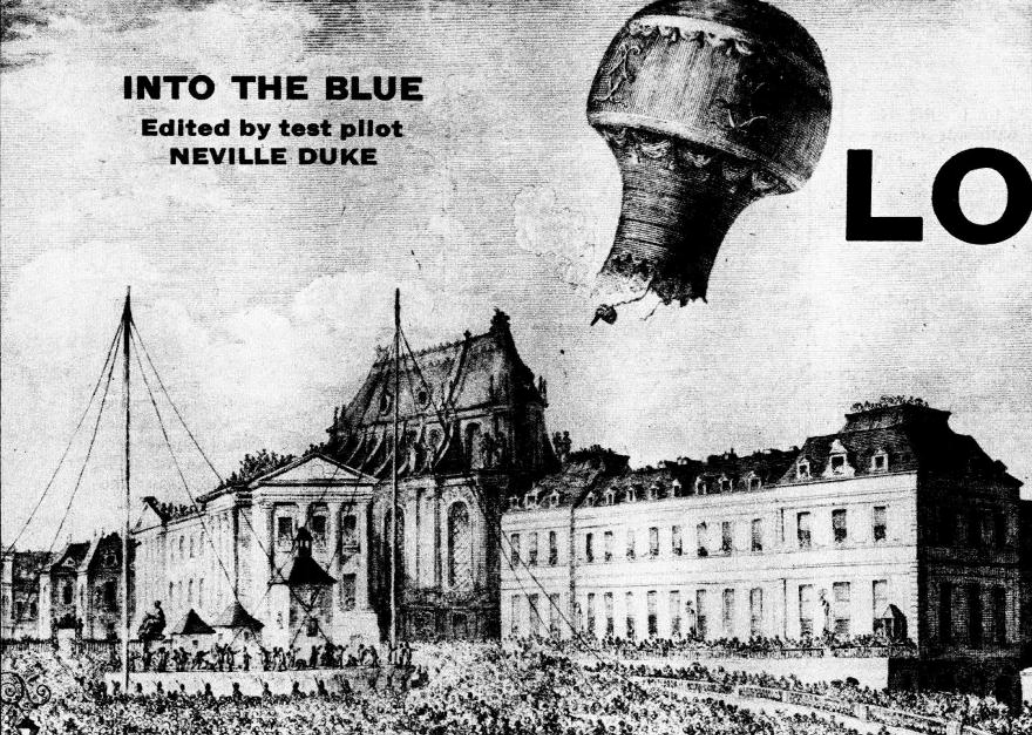
Their early efforts to get themselves off the ground involved the construction of elaborate flexible wings which they strapped to their arms, but no amount of vigorous flapping ever got them into the air. After a long series of failures, and quite a few bruises, some men began to think there must be an easier way.

Among them were the Montgolfier brothers, two Frenchmen who invented a hot-air balloon. This got off the ground in 1782, and again the following year when it carried a live cargo of a sheep, a chicken and a duck in a cage hung beneath it.

But balloons could not be controlled and were at the mercy of the wind. Then came the famous Wright brothers who were making glider flights by the year 1900, and made the first powered aeroplane which flew in 1903.

The next wingless machine, however, was the autogyro, invented by the Spaniard Juan de la Cierva. Although it had small stabilisers which looked like tiny wings, its rotor blades kept it airborne. They were not power driven like a helicopter, but rotated when the machine was driven forward through the air by its conventional engine.

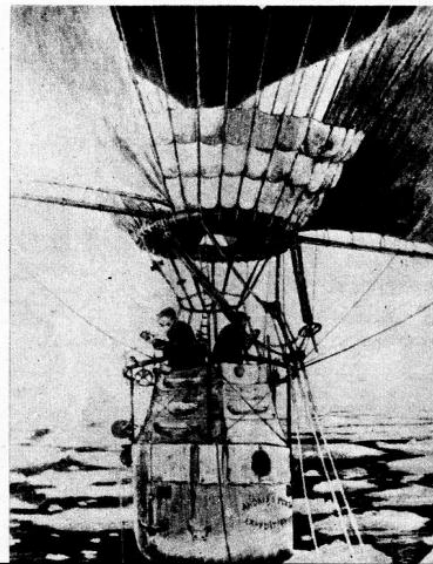
In July, 1897, Salomon Andree, a Swedish explorer tried to cross the Arctic in a balloon with two companions. They were forced down on the ice and not having proper clothing, died from exposure.



Above is a drawing of the Montgolfiers' hot-air balloon making a flight at Versailles, in September, 1783. It stayed up for eight minutes and travelled about two miles.



The Cierva autogyro (above) could not go straight up and down like a helicopter, but it could fly as slowly as 5 m.p.h. and was very economical. Below is a picture of one of the latest helicopters, the neat little Hughes 500.



WINGS!

Bond is doing it.

These did not last long and have been replaced by the modern helicopters, such as the inexpensive little Hughes 500. Built in America, it will carry five people.

* * *
Flying without wings is one of secret agent James Bond's latest tricks for getting himself out of trouble.

In his latest film he uses a Bell Jump Jet—a one-man rocket belt which is strapped to his back by a special harness.

Two nozzles emit powerful down-thrusting jets which are fed from twin cylinders of liquid rocket fuel carried on his back. Enough fuel is carried for about four minutes 'flying' time.

But Bond is not doing anything new. The rocket belt was first test-flown by the Americans as long ago as 1962, and has been much improved upon since.

Heights of between 300 and 500 feet can be reached, and by operating two rear-facing jets, forward speeds of up to 60 m.p.h. are possible.

The controls are similar to the throttle and brake levers on a motor-cycle handlebar and enable the 'pilot' to control the speed of his ascent and descent.

And so, at last, man is one up on the birds. He can leave the ground without even flapping his arms!

Below is a close-up of the two fuel tanks carried by Bond. One contains hydrogen peroxide and the other a form of kerosene, both under pressure.



INSIDE BRITAIN'S ATOMIC SUB.

COMPARED with the Navy's ordinary submarine, *H.M.S. Dreadnought*, Britain's first nuclear-powered underwater fighting ship, is a giant.

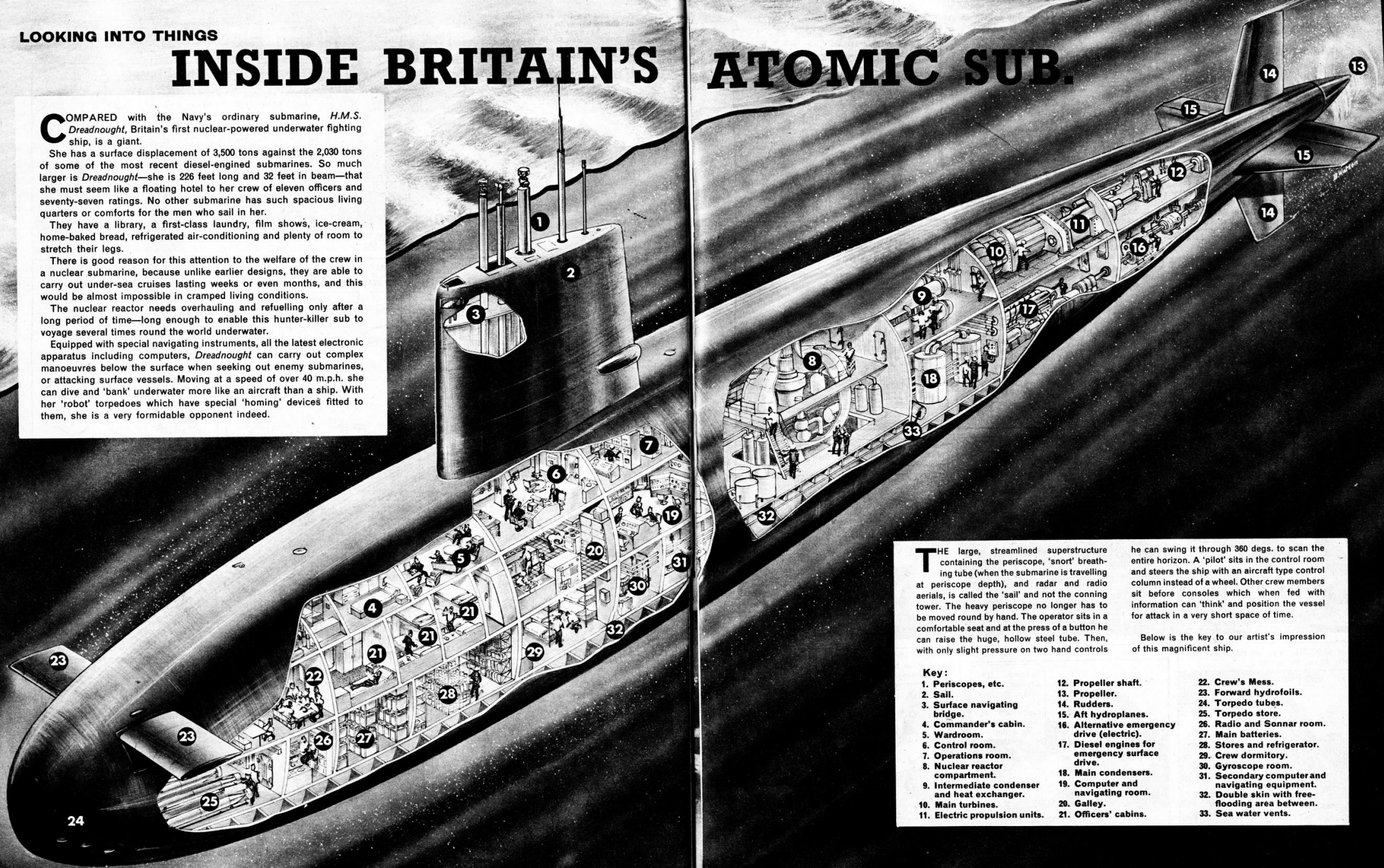
She has a surface displacement of 3,500 tons against the 2,030 tons of some of the most recent diesel-engined submarines. So much larger is *Dreadnought*—she is 226 feet long and 32 feet in beam—that she must seem like a floating hotel to her crew of eleven officers and seventy-seven ratings. No other submarine has such spacious living quarters or comforts for the men who sail in her.

They have a library, a first-class laundry, film shows, ice-cream, home-baked bread, refrigerated air-conditioning and plenty of room to stretch their legs.

There is good reason for this attention to the welfare of the crew in a nuclear submarine, because unlike earlier designs, they are able to carry out under-sea cruises lasting weeks or even months, and this would be almost impossible in cramped living conditions.

The nuclear reactor needs overhauling and refuelling only after a long period of time—long enough to enable this hunter-killer sub to voyage several times round the world underwater.

Equipped with special navigating instruments, all the latest electronic apparatus including computers, *Dreadnought* can carry out complex manoeuvres below the surface when seeking out enemy submarines, or attacking surface vessels. Moving at a speed of over 40 m.p.h. she can dive and 'bank' underwater more like an aircraft than a ship. With her 'robot' torpedoes which have special 'homing' devices fitted to them, she is a very formidable opponent indeed.



THE large, streamlined superstructure containing the periscope, 'snort' breathing tube (when the submarine is travelling at periscope depth), and radar and radio aerials, is called the 'sail' and not the conning tower. The heavy periscope no longer has to be moved round by hand. The operator sits in a comfortable seat and at the press of a button he can raise the huge, hollow steel tube. Then, with only slight pressure on two hand controls

he can swing it through 360 degs. to scan the entire horizon. A 'pilot' sits in the control room and steers the ship with an aircraft type control column instead of a wheel. Other crew members sit before consoles which when fed with information can 'think' and position the vessel for attack in a very short space of time.

Below is the key to our artist's impression of this magnificent ship.

Key:

- | | | |
|---|---|--|
| 1. Periscopes, etc. | 12. Propeller shaft. | 22. Crew's Mess. |
| 2. Sail. | 13. Propeller. | 23. Forward hydrofoils. |
| 3. Surface navigating bridge. | 14. Rudders. | 24. Torpedo tubes. |
| 4. Commander's cabin. | 15. Aft hydroplanes. | 25. Torpedo store. |
| 5. Wardroom. | 16. Alternative emergency drive (electric). | 26. Radio and Sonar room. |
| 6. Control room. | 17. Diesel engines for emergency surface drive. | 27. Main batteries. |
| 7. Operations room. | 18. Main condensers. | 28. Stores and refrigerator. |
| 8. Nuclear reactor compartment. | 19. Computer and navigating room. | 29. Crew dormitory. |
| 9. Intermediate condenser and heat exchanger. | 20. Galley. | 30. Gyroscope room. |
| 10. Main turbines. | 21. Officers' cabins. | 31. Secondary computer and navigating equipment. |
| 11. Electric propulsion units. | | 32. Double skin with free-flooding area between. |
| | | 33. Sea water vents. |

RANGER

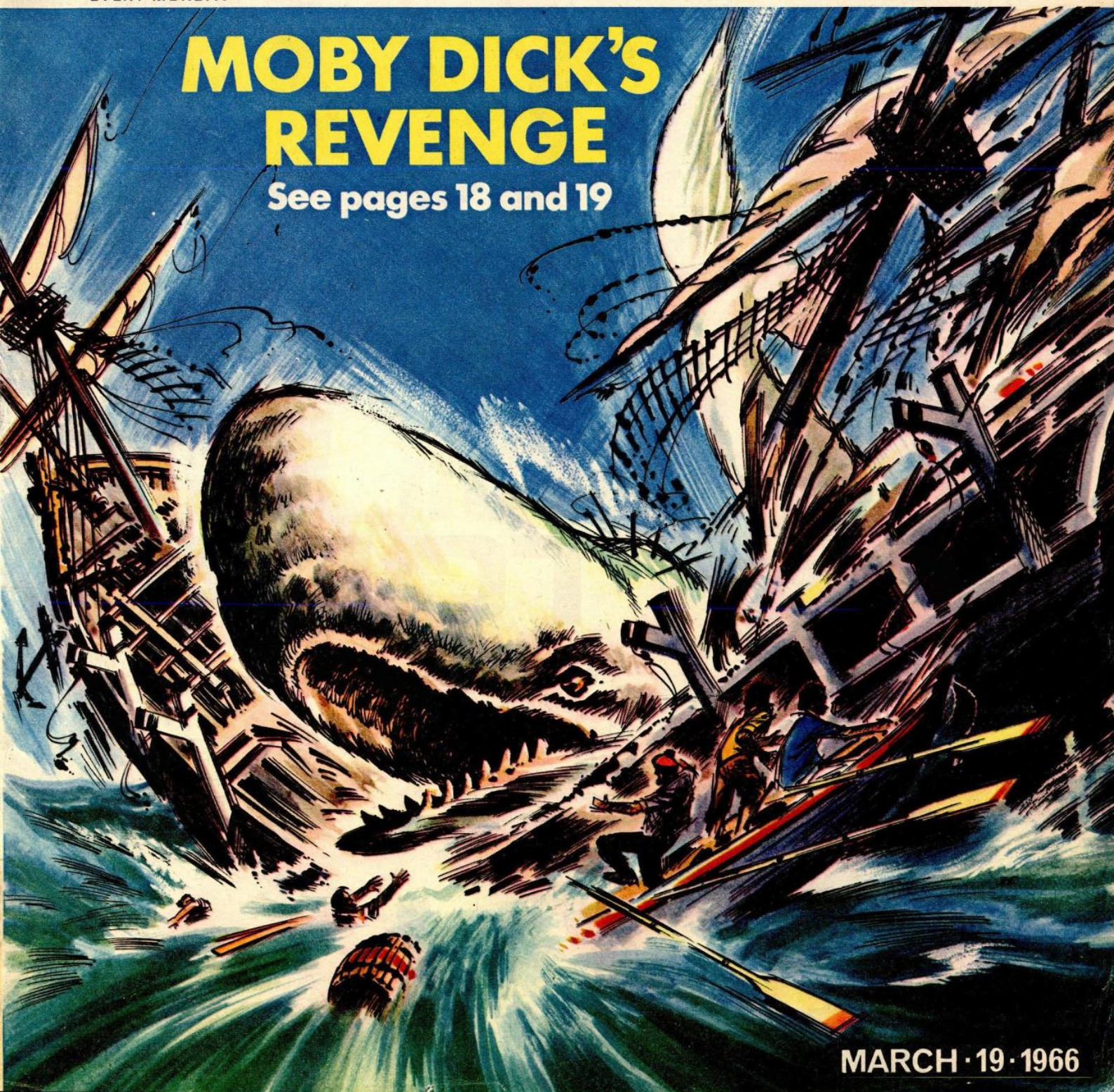
THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

PRICE 1s. 3d.

MOBY DICK'S REVENGE

See pages 18 and 19



MARCH · 19 · 1966

Scooter ahoy! Mr. Jack Hornsby and his daughter, Stella, demonstrate a new way of beating London's traffic jams by riding (or should it be sailing?) a converted Lambretta on the River Thames. The scooter is a standard 125 c.c. model which has special ski-type floats fitted (see picture on right). These are retractable and the rear wheel has a rotary paddle fixed so that it does not interfere with its road use. A rudder is controlled by the handlebars.



YOUR WORLD TODAY

YOU CAN LAUGH, BUT IT'S TRUE!

A gang of crooks in Paris stole hundreds of packets of sweets when they made a raid on a storehouse. But the French police soon caught them. The crooks couldn't resist stopping to nibble some of their ill-gotten gains and the police found them sitting around sucking sweets.

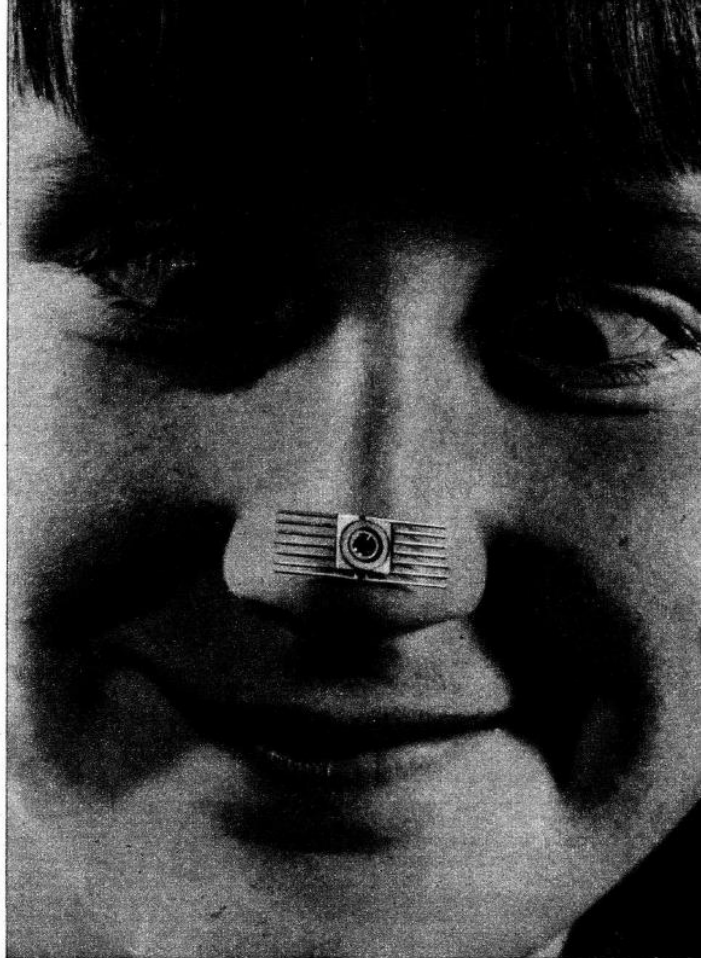


The longest place name in America is Chaggogguggmonchauggagoggchaubunagungamaug. Translated from the original Algonquin Indian dialect it means: You fish on your side, we fish on our side, nobody fishes in the middle.



Visitors to Loch Ness in Scotland thought their monster had appeared when they saw this odd-looking object in the water. But it turned out to be just a T.V. cameraman who was taking pictures of salmon fishing for a television series this winter. He had the camera on a special shoulder harness.

Now what's that they've stuck on the end of my nose?
It is actually a fantastically tiny micro-circuit which performs the functions of 20 transistors, as well as a number of other radio components. The black spot in the middle which contains most of the working parts, is no larger than the letter 'o' on a typewriter.



When a river in Surinam, Dutch Guiana, was dammed for a hydro-electric power station to be built, a huge man-made lake gradually appeared up-river trapping many wild animals. Hundreds were saved by an American animal protection society including this little chap. He is a three-toed ant-eater.

HELICOPTERS

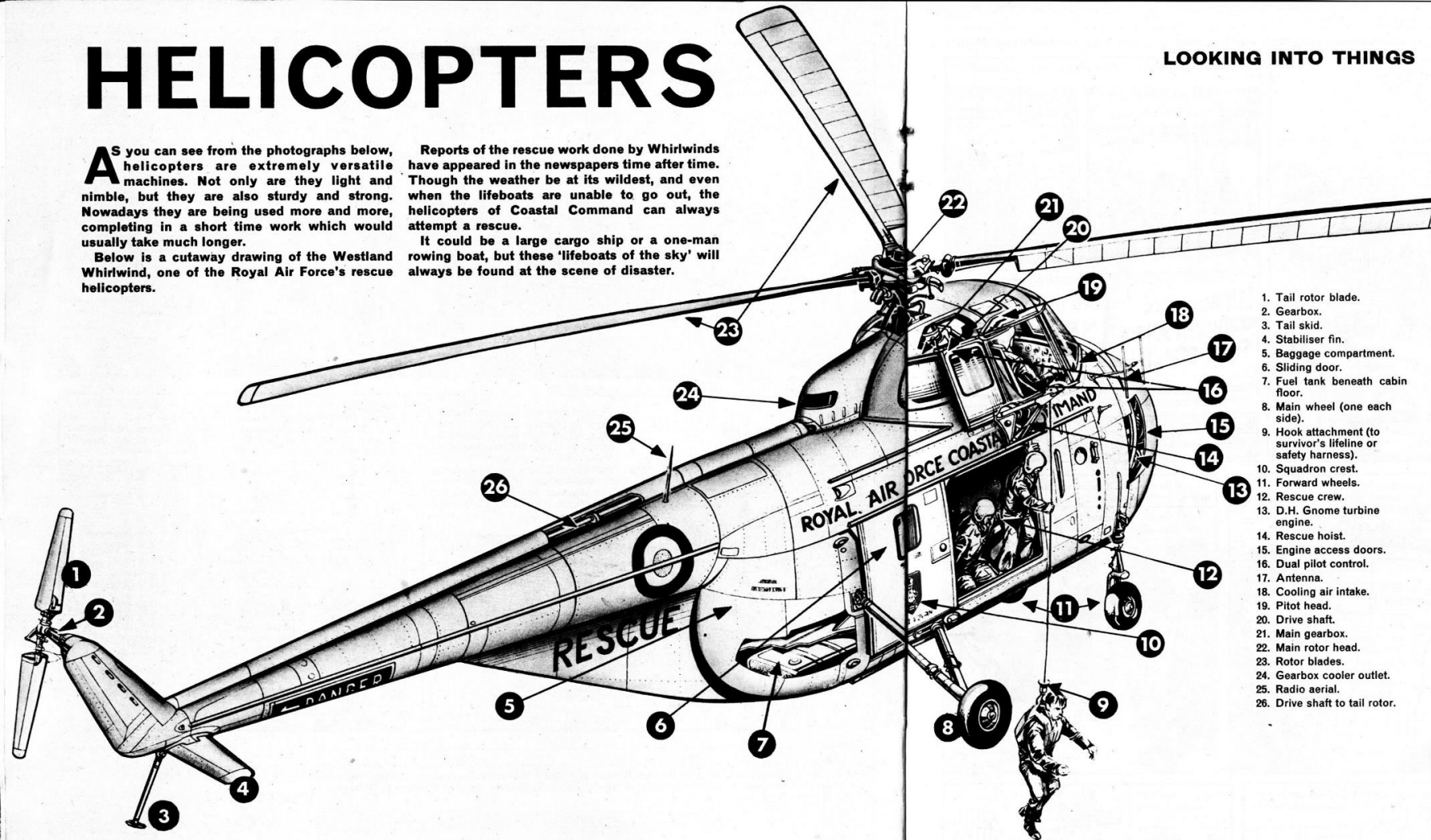
AS you can see from the photographs below, helicopters are extremely versatile machines. Not only are they light and nimble, but they are also sturdy and strong. Nowadays they are being used more and more, completing in a short time work which would usually take much longer.

Below is a cutaway drawing of the Westland Whirlwind, one of the Royal Air Force's rescue helicopters.

Reports of the rescue work done by Whirlwinds have appeared in the newspapers time after time. Though the weather be at its wildest, and even when the lifeboats are unable to go out, the helicopters of Coastal Command can always attempt a rescue.

It could be a large cargo ship or a one-man rowing boat, but these 'lifeboats of the sky' will always be found at the scene of disaster.

LOOKING INTO THINGS



1. Tail rotor blade.
2. Gearbox.
3. Tail skid.
4. Stabiliser fin.
5. Baggage compartment.
6. Sliding door.
7. Fuel tank beneath cabin floor.
8. Main wheel (one each side).
9. Hook attachment (to survivor's lifeline or safety harness).
10. Squadron crest.
11. Forward wheels.
12. Rescue crew.
13. D.H. Gnome turbine engine.
14. Rescue hoist.
15. Engine access doors.
16. Dual pilot control.
17. Antenna.
18. Cooling air intake.
19. Pitot head.
20. Drive shaft.
21. Main gearbox.
22. Main rotor head.
23. Rotor blades.
24. Gearbox cooler outlet.
25. Radio aerial.
26. Drive shaft to tail rotor.



Suspended from a hovering R.A.F. Belvedere, the 50-foot-long bronze spire was lowered on to the roof of Coventry Cathedral. In April, 1962, ground crews held the 11-ton spire steady with ropes until it was lowered into the cathedral's ruins.



Left: A British United Airways Widgeon helicopter at work on a civilian project. Carefully, it lowers down a 20-foot-long steel pipe which is to be part of a half-mile-long pipeline across a marsh. Normally the job would take from 10 to 14 days, but the helicopter manages to complete it in a matter of hours.



Left: A flying crane! An R.A.F. Belvedere helicopter shows off its strength. Its great rotor blades swish round as it loads up barges on the River Thames.

Right: Here's the Kaman HOK-1 helicopter of the U.S. Marines, which has one unusual feature besides its rather ugly squat body—it has no rotor blades in the tail. Instead its two main rotors revolve in opposite directions, similar to the movements of cog wheels. This helicopter, known as the 'Skyhook', lowers its cargo in a net attached to a hook. As soon as the cargo touches the ground, the hook releases automatically. The pilot can also release it from inside the cockpit.



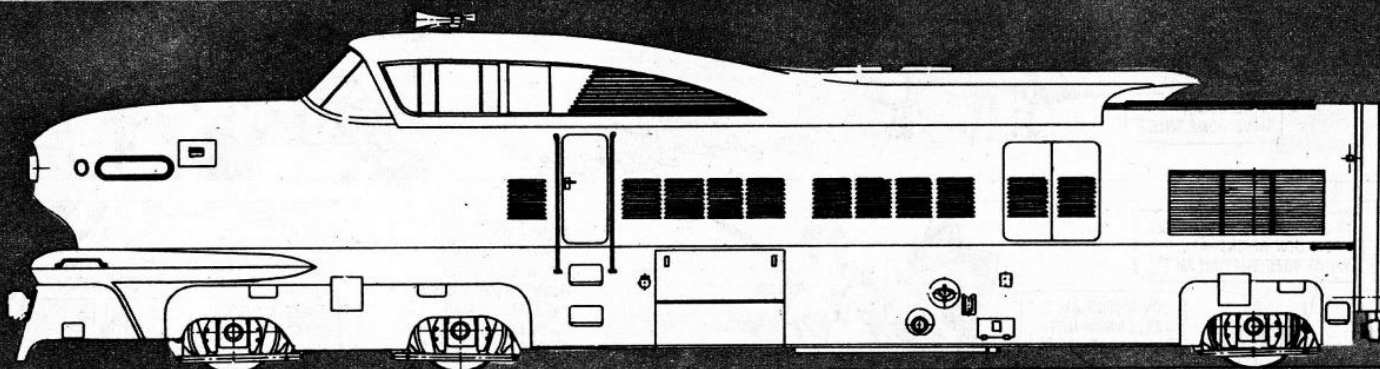
RAILWAY

DAYS AND WAYS

Edited by TV personality
and railway enthusiast,
DAVID NIXON



The streamlined nose of the Aerotrain gave it an eager 'let's-get-there-fast' look. Below is a side view of the locomotive.



THE RANGER REVIEW OF BRITISH RAILWAYS' LOCOMOTIVES

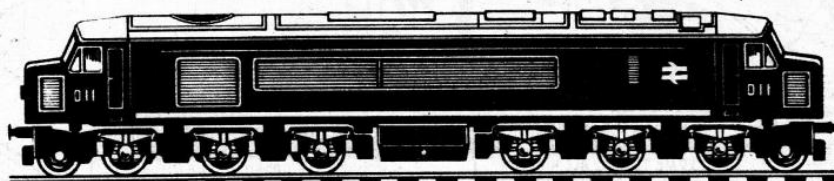
THE end of steam is in sight on British Railways and very few will be left in another year's time.

A wide variety of diesels is replacing them and to bring you up to date, **RANGER** will publish a series of side views of these locomotives.

Diesels tend to be allocated to regions, so even if you are familiar with those on your own line, when you go on holiday you may see those used on a different region.

BRITISH RAILWAYS' LOCOMOTIVES TODAY

No. 1



"PEAK" class 1-Co-Co-1 Type 4.

THESE "Peak" class locomotives are the largest and heaviest of British Railways' diesels. They have been working mainly on the Midland Region from St Pancras, but with electrification it seems likely they will

be moved elsewhere. It will be interesting to see where they go. They have a maximum speed of 90 m.p.h. The engine is a 12-cylinder, 2,300 h.p. Sulzer. Weight is 136 tons and overall length is 67 feet 11 inches.

As far as possible, all drawings in this series will be to the same scale.

**Designed like an
aircraft and
built by a motor
manufacturer**

THE AEROTRAIN

BACK in the early 1950s, railway designers thought that a fast train would nearly always be the quickest way to travel between towns not too far apart—after that, of course, the aeroplane would be unbeatable. But to do this, trains would have to reach speeds of 150 to 200 miles an hour!

Such high speeds set up stresses and strains which are not found at the normal train speeds of around the 80 to 90 miles an hour mark. These could be dangerous, and an intermediate design was built so that carefully controlled experiments could be carried out—this was the AEROTRAIN.

It was produced by the electromotive division of General Motors of America. The coachwork and the seating were designed on the principle of an aircraft fuselage.

Each coach was 40 feet 1 inch long, weighed 16 tons and carried 40 passengers. To save weight they ran on only four wheels instead of the usual eight. Two of them together carrying 80 people, took the same load as a standard American passenger coach. The weight of a double coach was only 32 tons—less than half the weight of a normal coach.

This exciting new train was sound-proofed and air conditioned, had buffet cars, and under each coach was a large luggage compartment.

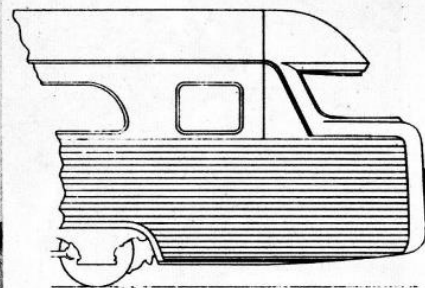
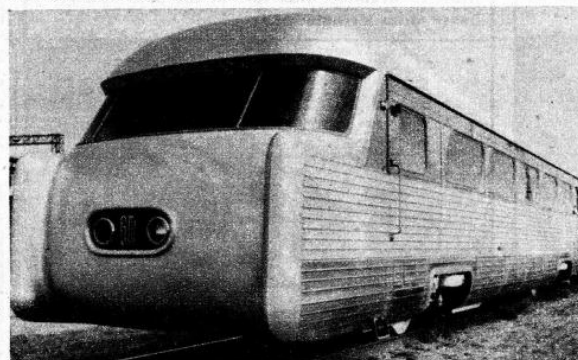
The streamlined locomotive was 53 feet long, 13 feet 7 inches high, and was powered by a 1,200 horse power diesel-electric unit which could take the train up to 102 m.p.h.

Two of these trains were built and were named on 22nd August, 1955. The first trial runs were on the New York Central and Pennsylvania Railroads in January, 1956. Later, they operated on the Mexican Railways for two years and finally were sold to the Chicago Rock Island Railway where they worked a fast suburban service.

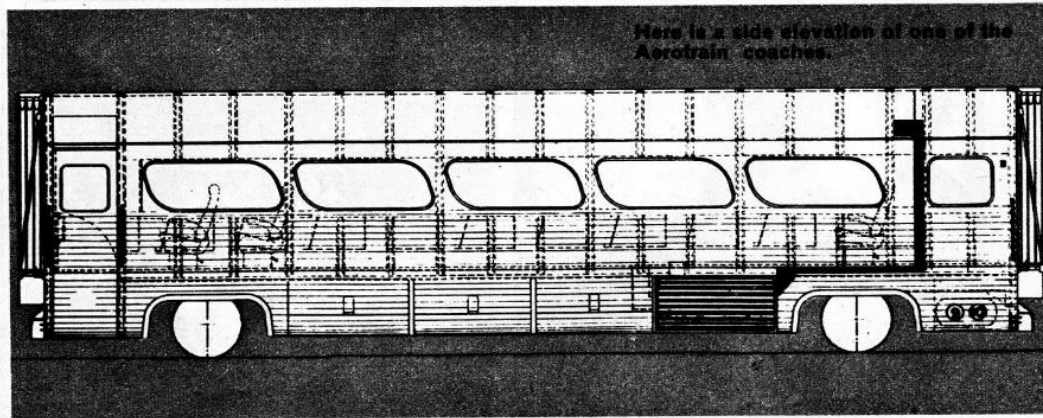
General Motors learned a lot from these experimental trains, and although no more have been built, I for one, am looking forward to the next development.



The interior of the Aerotrain looked like a modern aeroplane with adjustable aircraft-style seats. Test trains had ten coaches close coupled. The automatic coupler on the locomotive folded behind streamlined doors.



The train had an 'air ride' suspension rather like that used on some B.M.C. motor cars, except air was used instead of liquid. The end observation coach was streamlined as, at speed, the air turbulence could have sucked up stones from between the sleepers.



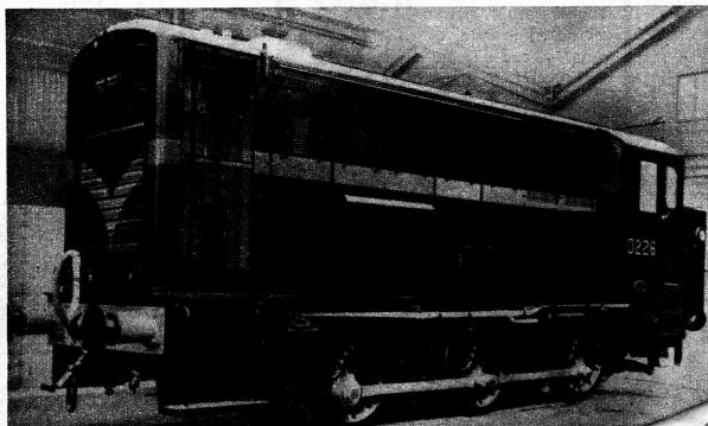
Here is a side elevation of one of the Aerotrain coaches.

THE KEIGHLEY LINE GETS A NEW ENGINE

News about the Keighley and Worth Valley Railway.

YORKSHIRE readers will already know about this line which runs from Keighley through Haworth to Oxenhope. It is run by a very active preservation society and has some interesting steam locos.

Now they have been presented with this smart 0-6-0 diesel on permanent loan from English Electric. It is a prototype model of these 500 h.p. class diesel-electrics, which were used for shunting by B.R. It has a maximum speed of 40 m.p.h.



RANGER

THE NATIONAL BOYS' MAGAZINE

27

EVERY MONDAY

PRICE 1/3

The RED DEVILS in action!

See pages 22 and 23



APRIL · 2 · 1966

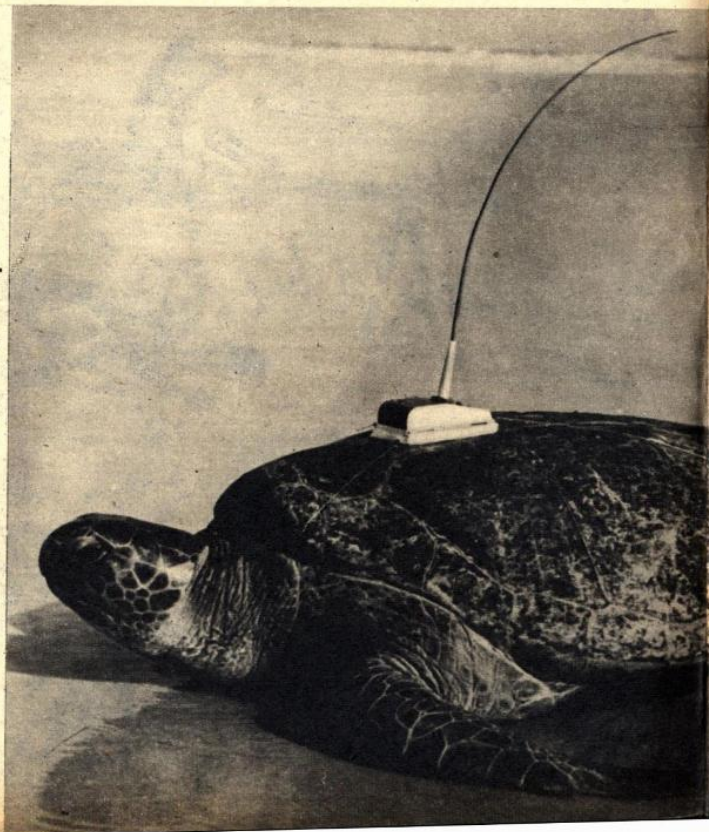


YOUR WORLD TODAY

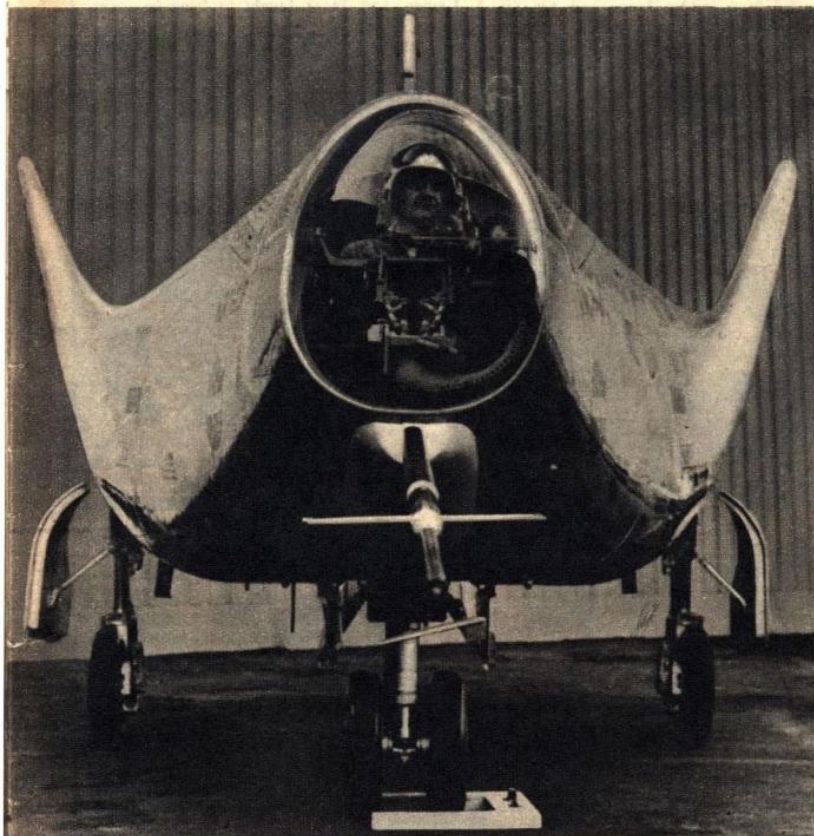
Taking a backward somersault through a burning hoop is all in a day's work for these men. They are members of a specially trained 350-man unit of Portuguese marine commandos. The men are all volunteers and are training to serve in Portugal's overseas territories in Africa where they carry out anti-guerrilla warfare. Apart from the physical exercise, stunts of the kind in the picture help to build up self-confidence.



◀ These are three of the oddest looking chimneys we have ever seen. They are on the roof of a house in Fribourg, Switzerland, and each one serves a separate room. The tiny tiled roofs are to keep out snow and rain.



Described as a Lifting Body, this revolutionary new space vehicle has been made as an experiment for America's National Space Agency. It is designed to help solve the problems of re-entry into the earth's atmosphere. It will be tested by being dropped from a bomber at an altitude of 45,000 feet and will then glide and manoeuvre at high speeds. Later experiments will include the use of rocket engines.



You can laugh—but it's TRUE

There are so few trees in the New Forest which have holes in their trunks for birds to nest in that the Hampshire and Isle of Wight Naturalist Trust are taking action. They are supplying numbers of specially built nesting boxes to help the birds overcome their housing problem.



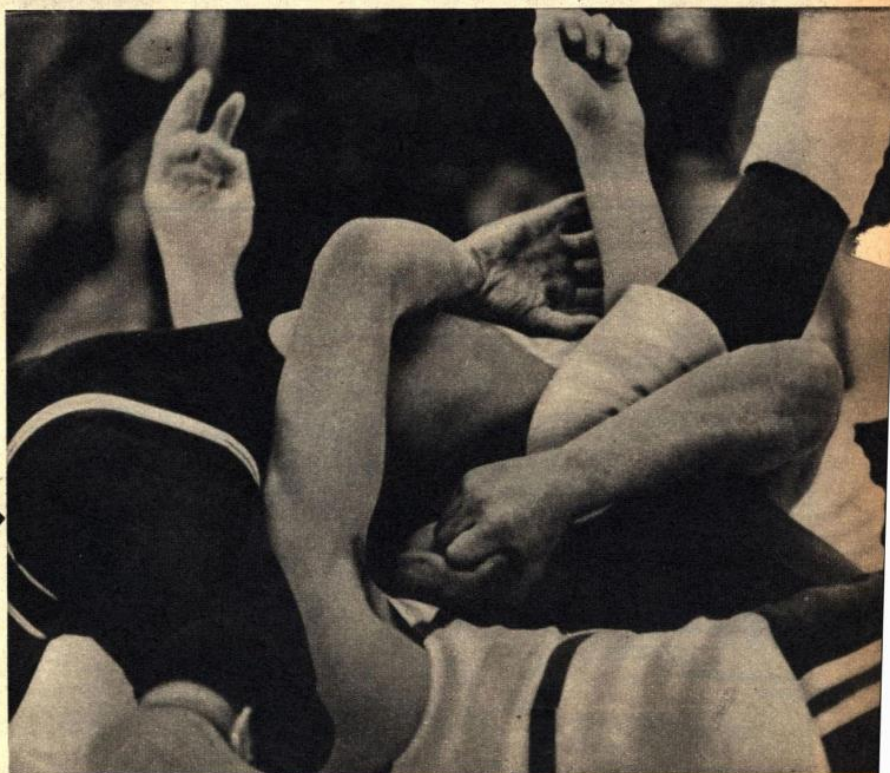
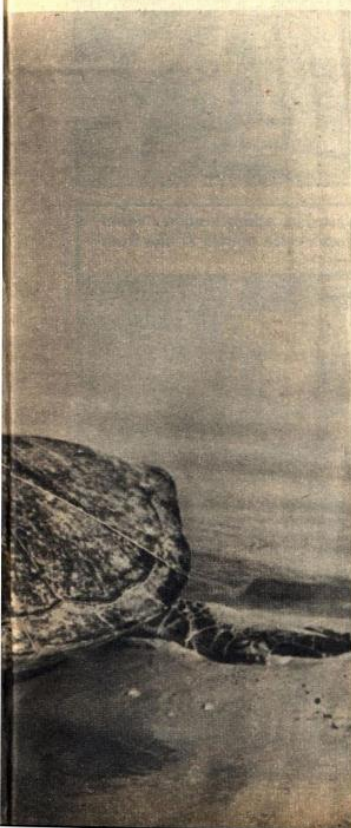
"Just my luck!" thought motorist John Martin as he pulled off the road on to the verge with two flat tyres, but within the half-hour during which he was trying to deal with his double puncture, 27 other cars also slithered to a halt with flat tyres! When police patrols came to investigate they found a 200-yard stretch of the main road near Bawtry, in Yorkshire, was scattered with six-inch long metal spikes which it is believed fell off a lorry carrying scrap metal.



Scientists in Florida have always wanted to know where the great green turtles go when they migrate. These huge creatures—some of them weigh over three hundredweights—are known to travel 1,000 miles, and to keep track of them some are being fitted with radio transmitters. The signals they send out will be bounced back from space satellites. The transmitters will not harm them in any way.

"Pardon me, but I think that's his foot you have in my mouth—or is it your finger in my ear—oops! Sorry, it's my own!"

This tangle of arms and legs belongs to two wrestlers—plus an extra arm from the referee.





The Ford GT40 being put through its paces at Le Mans.

THE development of the Ford GT40 is a fascinating story, and shows the time and trouble that is taken before a competition car ever reaches a racing track.

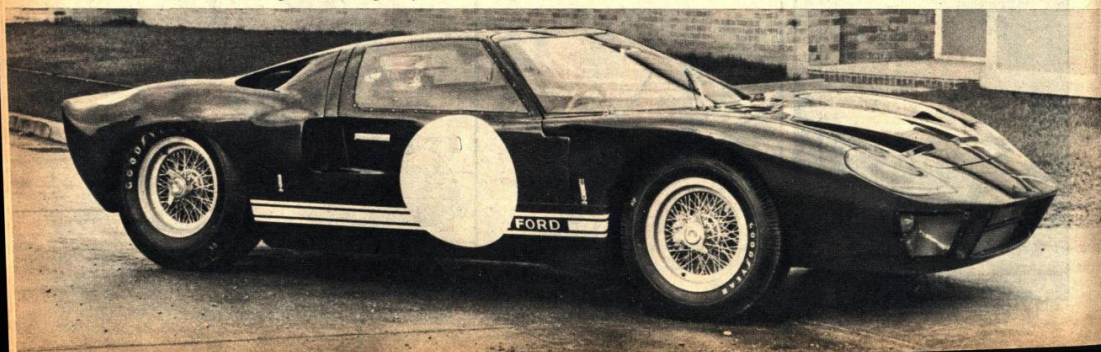
It was back in the summer of 1962 that the present Henry Ford first thought of creating a new car for international racing. He set up a small team of experts at Slough, Buckinghamshire, who began the work of designing.

A year later, they got down to the job of actually building the car and, in 1964, after eight months of intensive work, the GT40 appeared in public for the first time when it was taken to the Le Mans track, in France, for testing and training purposes.

Then its racing life began. It was entered for the 1000 kilometre race at Nurburgring, Germany; the twenty-four hour race at Rheims, France, and at Nassau in the Bahamas.

Its performance gradually improved, and soon it created a lap record at Le Mans when the great

The side view of the GT40 gives a feeling of speed.



CARS AND ALL ABOUT THEM

Edited by GRAHAM TOMLINSON,
Britain's youngest racing driver

THE COMPETITION CAR TO WATCH

The Ford GT 40

I just could not let you miss these wonderful photographs of the Ford GT40. So I have persuaded the Editor to combine 'Looking Into Things' with my page and give you two pages instead of one.

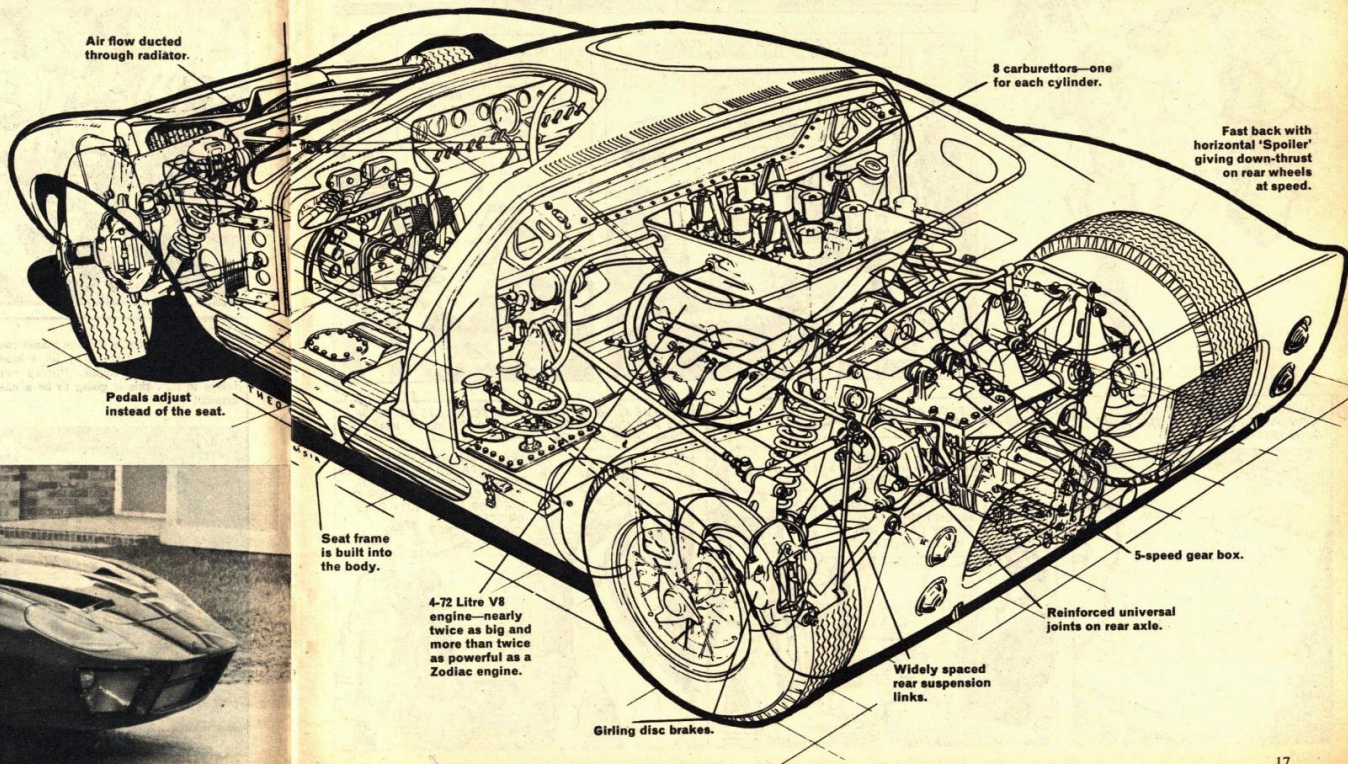


Above, standing proudly beside his '999' Ford racing car is the famous Henry Ford, grandfather of the man who created the up-to-date streamlined car on these pages, the Ford GT40.

It was in this four-cylinder '999' which very much reminds me of a power-assisted bed, that Ford unofficially broke the world land speed record. He was a great believer in

publicity and this was his way of attracting customers to buy his cars. He had a mile marked out on a frozen lake in America, and on a cold winter's day in January, 1904, he made his attempt.

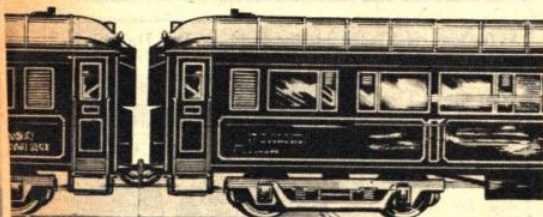
He reached a speed of 91.37 m.p.h., which must have been pretty hair-raising in this old tearaway—especially when you know that Ford had removed the clutch and gears!



RAILWAY

DAYS AND WAYS

Edited by TV Personality and
railway enthusiast, David Nixon



DURING the days of steam, the "Arlberg route", as the line through the Austrian Alps was known, gave the locomotive engineers a tough problem. For years they tried to build engines which could tackle the loads and the mountains without having to use two or even three at a time. Austrian engineer Dr. Karl Goldsdorf finally tamed the mountains with his slow but enormously

powerful ten-coupled compounds. For easier parts of the route he designed a fast 2-6-4, a wheel arrangement not seen often in Britain on tender engines. The four trailing wheels carried the huge firebox which gave this class of locomotive its free steaming quality. Here we show one of these "High Flyers" with its great 7-foot driving wheels.



The shunter

AN idea which rather took my fancy the other day when I saw it was this unusual shunting vehicle. It is called a Trackmobile and has come over to Britain from America.

When it has finished shunting on one siding, the driver puts down a set of road wheels and away it goes, tracking sideways like a crab across the rails until it comes to the next set of wagons to be moved. The Trackmobile can be steered like an ordinary

Left: The Trackmobile pulling loaded wagons. Right: (1) A close-up of the Trackmobile on the railway lines with its road wheels raised. (2) The road wheels are lowered and begin to take the weight of the vehicle. (3) The road wheels in action having lifted the flanged metal wheels off the track.



THE 'TRANSALPIN'

AUSTRIA'S latest international express, the new 'Transalpin', links Vienna with Basle on the Swiss-French frontier, a distance of 580 miles, and as its name suggests, it has to cross some of Europe's highest mountains.

It covers the journey in the remarkably fast time of 11 hours 45 minutes which gives it an average speed of a little over 50 m.p.h. Not very fast, you may think, but the Austrian Alps are the longest and toughest barrier for railways in the whole of Europe.

For 250 miles between the Swiss frontier and Salzburg, the line winds continuously along dizzy mountain ledges, through tunnels, snowsheds and wild ravines. Sometimes the 'Transalpin' has to climb amidst snow-capped peaks to a height of 5,000 feet, and tackle gradients of 1 in 38.

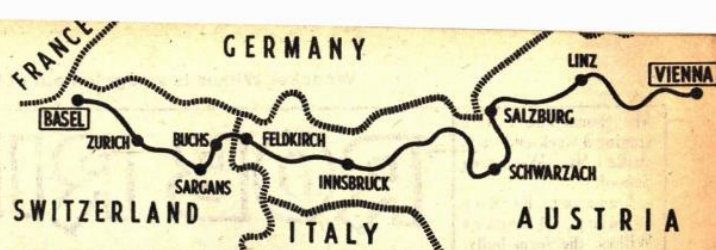
Power and Speed

The line is fully electrified and the train is hauled by a powerful 3,400 h.p. electric locomotive which has a top speed of 93 m.p.h. Because the train has a driving car at each end, it looks like a multiple unit such as British Railways use on their Southern Region, but this is not so. The 'Transalpin' makes eight stops and four of these are reversals at which the train has to change its direction.

Three trains, each of six coaches, are needed to maintain the service. All have first and second class accommodation, a restaurant car, air conditioning, and are fitted with disc brakes.

Each train totals 230 tons, and the combination of this light weight with the powerful locomotive gives maximum performance over the difficult mountain sections, and really fast running over the easier stretches of the route between Salzburg and Vienna (see map on top right).

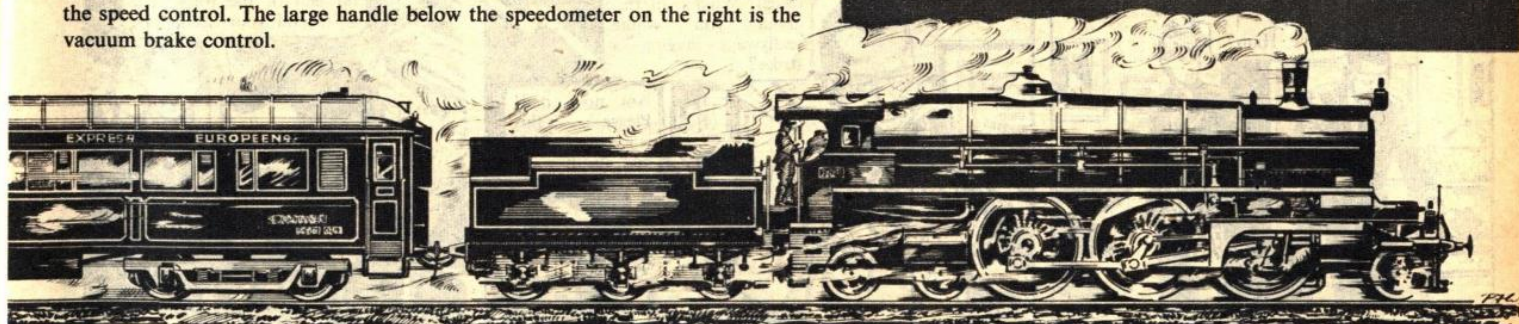
The driving cabs of the locomotives are quite impressive as you can see from the picture on the right. What looks like a steering wheel in the centre is actually the speed control. The large handle below the speedometer on the right is the vacuum brake control.



Here is a map of the route covered by the 'Transalpin' express. It is one of the most mountainous railway lines in the world.



The driving 'desk' of the power car in the 'Transalpin'. The controls are clear and easy to reach in an emergency.



that shoots across sidings

tractor, but what is so clever about it is the way it can move a 250-ton load of wagons in spite of the fact it weighs barely 5 tons.

The secret of this little flyweight being able to move such big loads lies in its special hydraulic coupling. When it clamps under the buffer beam of a wagon, it lifts it slightly thus transferring some of the weight on to itself and increasing the grip of its wheels on the rails. Without this help it would

skid. For extra grip when the rail is wet, it can spray sand under its driving wheels.

A 3-cylinder diesel engine developing 35 b.h.p. moves the Trackmobile at a maximum speed of 12 m.p.h. on its road wheels. Its speed on the rails is slightly less and depends on the weight it is dealing with. It's one of the toughest little chaps I've met!

Incidentally, very few are over here yet, and all are operating in private sidings.

The Trackmobile has four gears in every direction, and has a buffer beam at the front for pushing wagons.

Safety beacon

Exhaust

Coupling eye

Hydraulic jack which slips under the buffer beam of wagon being towed, taking some of the weight on to the Trackmobile.

Driving mirror



"ODD JOB MAN" OF THE SKIES

INTO THE BLUE
Edited by test pilot
NEVILLE DUKE

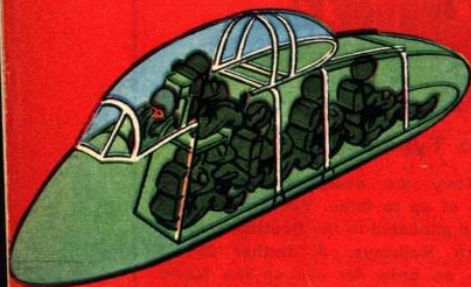
A VERY wide variety of military aircraft are made these days apart from the fighters and bombers which we hear so much about and among the most interesting, I think, are planes designed specially for Army Co-operation.

Fighters and fighter-bombers can give considerable help to ground troops, but when the army needs really close support, it must have a machine with abilities which no high speed jet can possess.

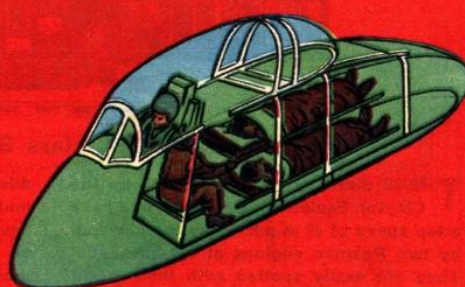
A great deal of thought has gone into this American close-support aircraft—called the Convair Charger—and I asked our artist to draw one for you. It is not a very big aircraft. The wing span is only 27 ft. 6 in. and the length 34 ft. 10 in., but it has a remarkable performance which makes it ideal for helping the army in battle.

The power of its twin turbo-prop engines enable it to rise 50 feet into the air when it has travelled only 150 yards over the ground. Very useful in forward areas where there are unlikely to be long concrete runways.

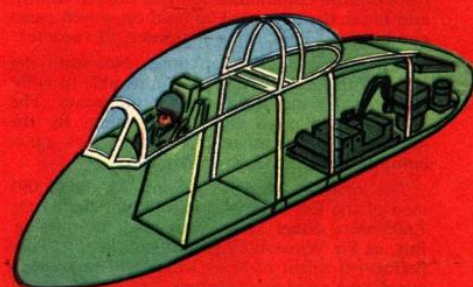
It has a top speed of 403 m.p.h. and apart from being able to carry rockets or bombs, it has its own armament of four 7.62 mm. machine guns in pods each side of the fuselage.



The 'Charger' is wonderfully adaptable. With absolutely no home comforts such as seats, you can cram six combat-armed paratroops into the fuselage and drop them out of the rear opening doorway.



When used as a flying ambulance, there is room for two stretchers and a medical orderly. Removable armour plating can be fitted to protect the occupants when the aircraft is operating in dangerous forward battle areas.



As a simple cargo carrier, the 'Charger' has unlimited possibilities. It can be loaded with all types of supplies needed by troops in the battlefield. Weapons, ammunition, food, etc., can be loaded in special packs and dropped by parachute.

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

PRICE 1/3



**JETS IN
COLLISION
AT 700 M.P.H.!**

See pages 12 and 13

APRIL · 16 · 1966

INTO THE BLUE

Edited by test pilot
NEVILLE DUKE

A JEEP FLIES—AND PLANES GO BY ROAD!

YES, it IS a jeep flying in mid-air that you can see in the picture on the right!

This extraordinary machine was developed by Britain during World War II. Vehicles dropped by parachute could not be controlled and some method of landing them more accurately was needed.

The Rotabuggy, as it was called, was a standard Army jeep, with a two-bladed rotor attached to its roof and a special tail unit to keep it steady in the air.

The idea was for it to be towed by an aircraft to the target area and released. The slipstream turned the rotor blades, and the pilot would try to guide it down to the landing zone.

Unfortunately, during the trial flights, things did not go always as expected. The Rotabuggy wandered up and down as it was being towed, and the pilot had a desperate fight to keep it under control. It was funny to watch, but nerve-shattering for the pilot!



THIS fantastic aeroplane that can be driven along the road was designed by an American, and took him two years and £821 to build. Its cruising speed in the air is 85 m.p.h. and its average road speed is 50 m.p.h. The wings fold back.



A HOUSE, WITH GARAGE, ON WHEELS

THIS amazing, British-made vehicle is the only one of its kind in the world and cost around £25,000 to build. It is built on an A.E.C. bus chassis and was specially designed by Radford Coachbuilders Ltd., in London, who are now building cheaper models with less super-luxury fittings.

The Carabus is divided into four main compartments: the living room and driving compartment at the front, the bedroom, the kitchen/bathroom and the dining room. In addition to these, there is a small compartment at the rear which provides separate sleeping accommodation for the chauffeur.

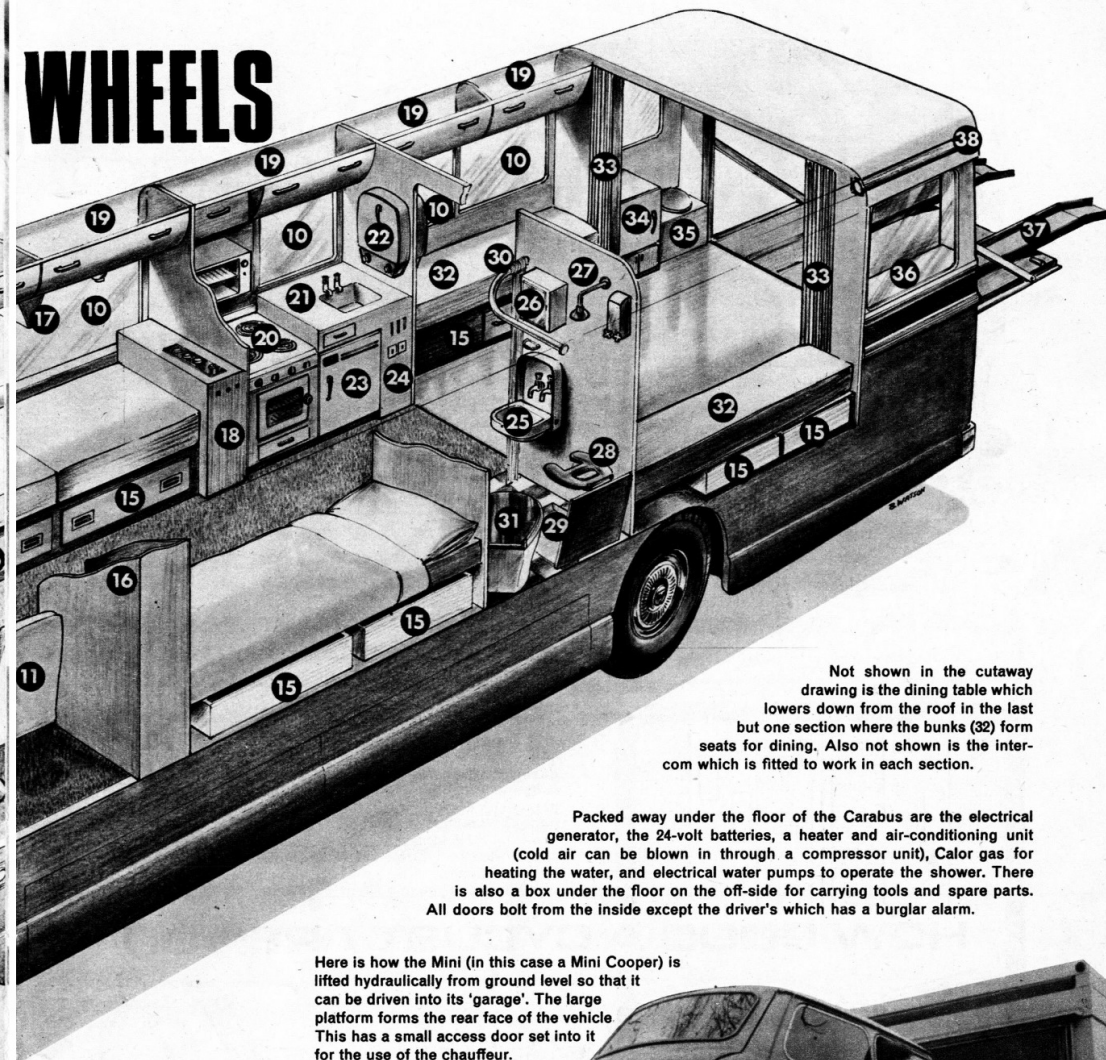
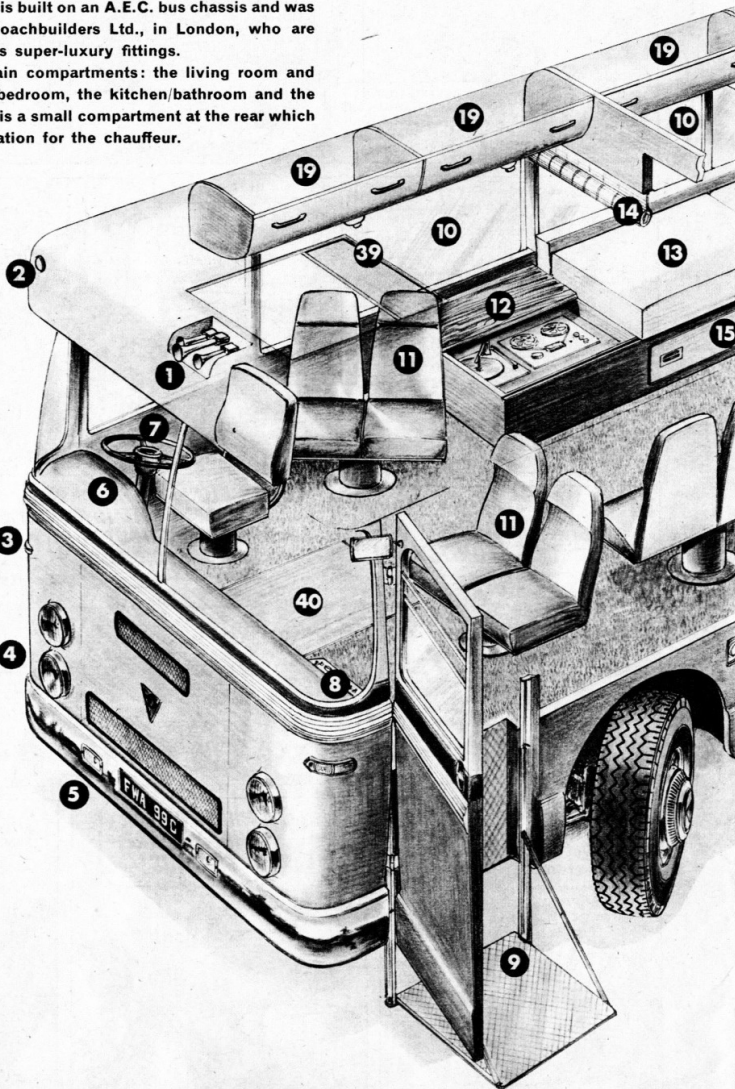
As you will see from the key to the cutaway drawing, the vehicle is fitted with many luxury items such as stereophonic recording equipment, intercom between driver and passengers, and perhaps most remarkable of all, a 'garage' for a Mini.

The bedroom contains two 2 ft. 6 in. beds. Under these are two 100-gallon fresh water tanks. The dining room can accommodate up to seven people for a meal.

The Carabus is powered by a 6-cylinder 153 b.h.p. diesel. A smaller diesel generator provides electrical power.

KEY:

1. Alpine windtone horns.
2. Side lights.
3. Side lights and blinkers. (Side lights are for parking only in many continental countries.)
4. Twin headlamps.
5. Foglamps built into front bumper.
6. Fully instrumented driving panel.
7. Power assisted steering and brakes. 6-speed synchromesh gearbox.
8. Full width panel controlling all services: generator, heating, refrigeration, water heating, etc.
9. Hydraulically operated passenger lift.
10. Electrically controlled windows fitted with mosquito blinds and sun blinds.
11. Double aircraft type seats, fully adjustable and turning to face inwards.
12. Radio, record player, tape recorder with stereo sound through speakers in roof.
13. Bunk. When radio console is closed, bunk can be run forward over it and the back tipped up to form an easy chair. When this is done the radio console can be worked by remote control.
14. Roller blind dividing forward compartment from sleeping compartment.
15. Storage drawers.
16. Wardrobe.
17. Overhead control panel.
18. Auxiliary control panel.
19. Storage lockers, each fitted with inside light which switches on automatically.
20. Electric stove with oven and top grill.
21. Sink with H & C.
22. Mechanised dish washer.
23. Refrigerator.
24. Control panel for kitchen area.
25. Folding hand basin with H & C.
26. Wall cabinet.
27. Shower.
28. Folding seat for use when taking shower.
29. Sink to shower. Lid closes over this when not in use.
30. Shower curtain.
31. Toilet.
32. Settees which open out into two bunks.



Not shown in the cutaway drawing is the dining table which lowers down from the roof in the last but one section where the bunks (32) form seats for dining. Also not shown is the intercom which is fitted to work in each section.

Packed away under the floor of the Carabus are the electrical generator, the 24-volt batteries, a heater and air-conditioning unit (cold air can be blown in through a compressor unit), Calor gas for heating the water, and electrical water pumps to operate the shower. There is also a box under the floor on the off-side for carrying tools and spare parts. All doors bolt from the inside except the driver's which has a burglar alarm.

Here is how the Mini (in this case a Mini Cooper) is lifted hydraulically from ground level so that it can be driven into its 'garage'. The large platform forms the rear face of the vehicle. This has a small access door set into it for the use of the chauffeur.



KEY continued:

33. Concertina-type door which separates dining area.
34. Chauffeur's refrigerator.
35. Toilet.
36. Lockers.
37. Hydraulic lift to raise Mini. This folds up to form back door.
38. Roller sun canopy extends length of vehicle.
39. Sun roof.
40. Hydraulic lift raises platform high enough to enable person to look over roof for photography.

RANGER

THE NATIONAL BOYS' MAGAZINE

EVERY MONDAY

PRICE 1/3

Here come the
FIRST MOON Men!

See pages 2 and 3



APRIL 30 1966



YOUR WORLD TOMORROW

LIFE ON THE MOON

WITHIN a few years from now the first men will set foot on the Moon. Putting them there will have been by far the most difficult and costly task ever undertaken.

Preparations for this fantastic journey through space are going on in your world today, but this week, in Your World Tomorrow, Ranger brings you a glimpse of how it will be achieved and what might be found on the Moon's mysterious surface.

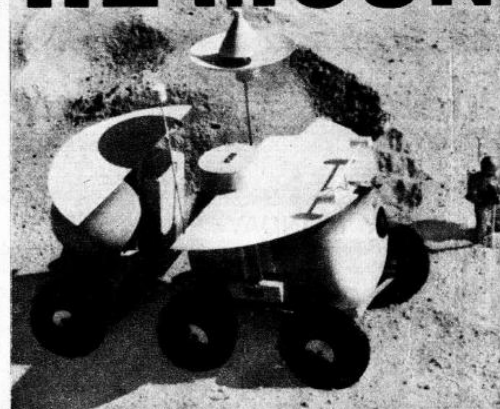
After man's early Moon trips, much more ambitious projects are planned. The first Lunar landing vehicle (see right-hand page) or Moonbug as the Americans call it, will carry little more than the men themselves plus simple equipment, such as cameras and radiation testing meters.

Later excursions will be made in much larger and more complicated spacecraft which will carry, piece by piece, sections of special buildings for erection on the Moon's surface, together with various kinds of machinery.

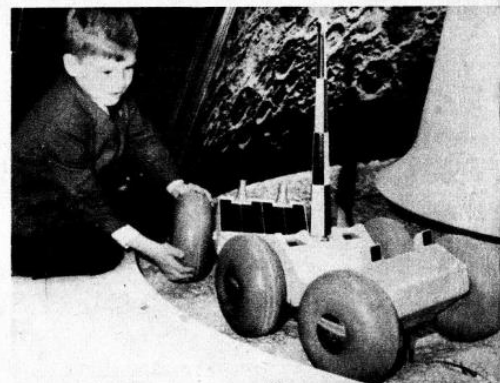
In the drawing below is our artist's impression of what the early Moon colonies may look like. As there is no protective envelope of atmosphere, the temperature on the Moon's surface varies between that of boiling water during the day, to *minus* 150 deg. C in the lunar night.

To protect them from this and other hazards, pressurized domes (A) will be inflated connected by corridors (B). These could contain different machinery but we have shown a mining drill (D). This is itself pressurized and could work independently of the dome. Communications aerials (C) keep the men in touch with Earth. Movement over the rocky terrain will be in special mobile laboratories nicknamed Molabs (E), while (F) small communication rockets with rendezvous with larger orbiting spacecraft.

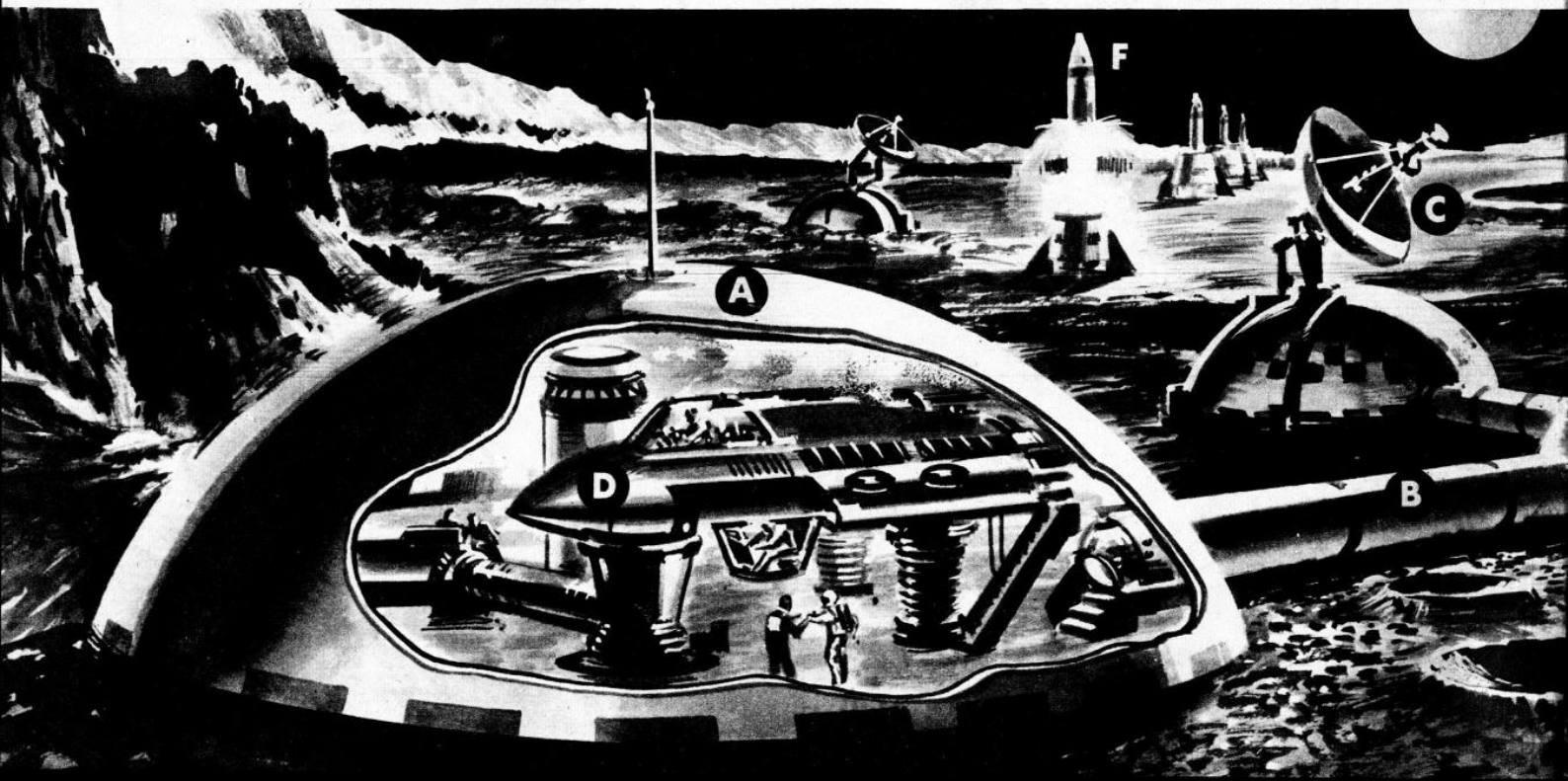
Wearing a pressurized spacesuit with its own oxygen supply, an astronaut moves cautiously over the Moon's surface.



This is a model of a Molab, or Moon laboratory. Several different types have been designed for exploring the surface of the Moon.



By the time 6-year-old Kevin Knight leaves school men will already have landed on the Moon and be using one of these special lunar vehicles.



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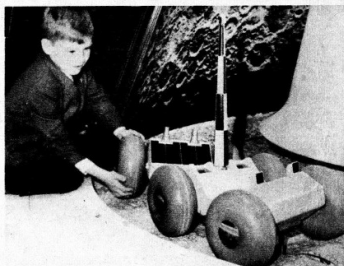
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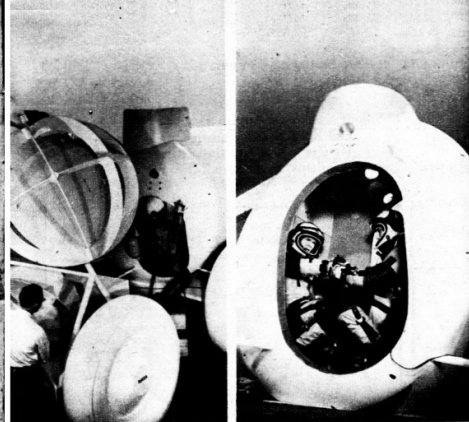
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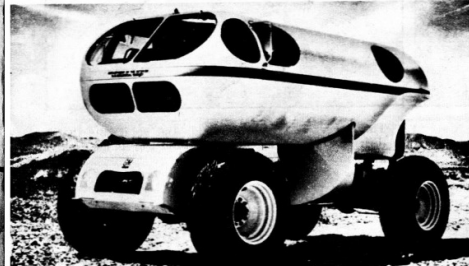
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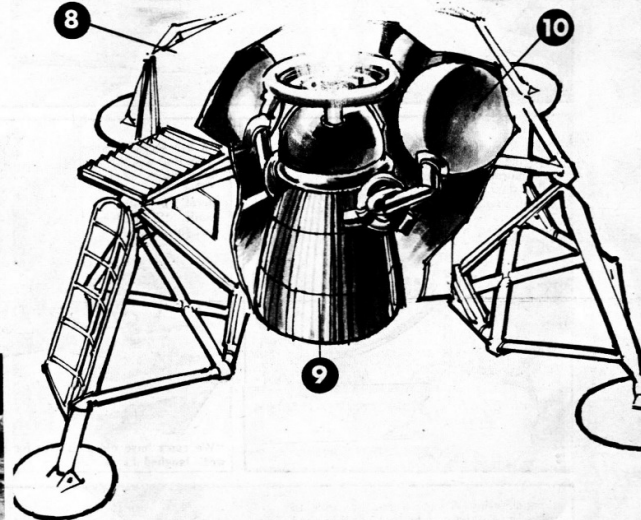
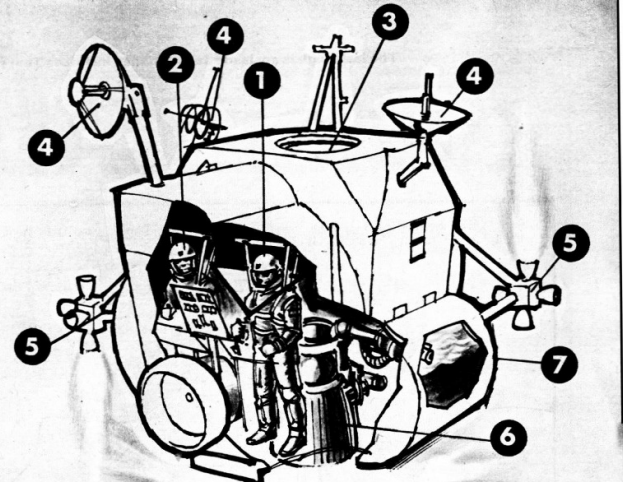
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Left is a closer view of a Molab and on the right are two space-suited astronauts practising inside the airlock. Once inside the vehicle, the astronauts can remove their suits.



This is a full sized mobile geological laboratory which will be used for moving over the expected rough ground on the Moon. It weighs 8 tons and will be packed with instruments.

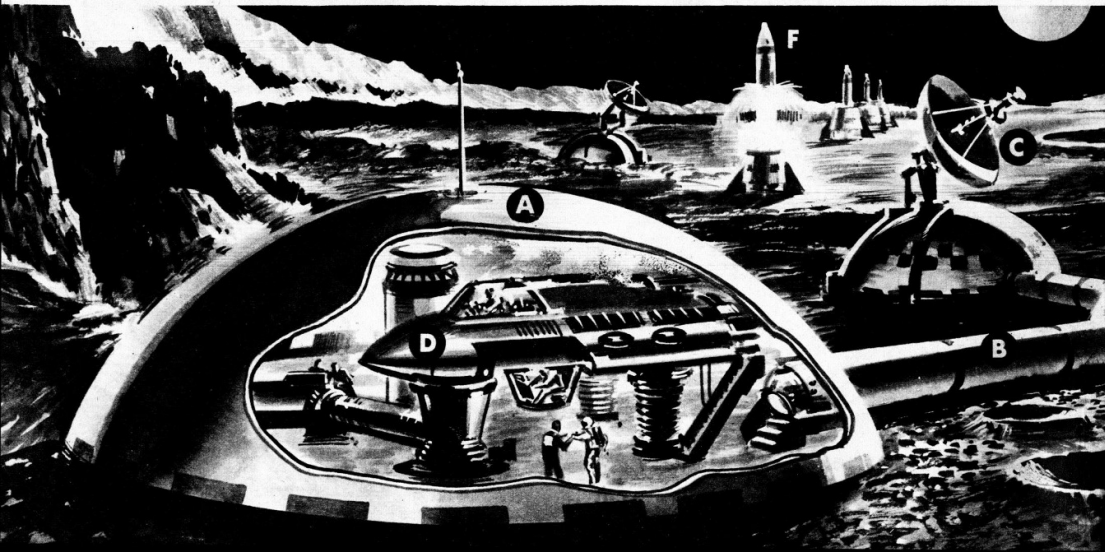


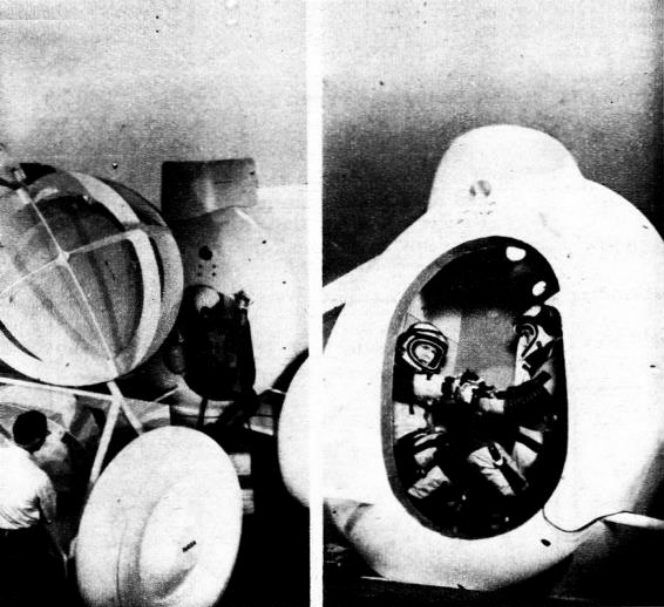
THE MOON BUG

AN enormously powerful three-stage rocket will blast the astronauts across the 250,000 miles of space to the Moon. On the nose of this will be the Moonship itself. This will be in three parts, only two of which will land on the Moon's surface. The third part will remain in orbit round the Moon to enable the three-man expedition to return to Earth.

In the drawing above we have shown the sections which will be used to land and take-off again from the Moon's surface. The pilot and co-pilot (1 and 2) are suspended in shock-absorbing harnesses which are lighter and safer than seats. They will control the descent of the double-section of the Moonbug by means of a retro-rocket in the lower section (9) which also has four landing legs.

This landing platform (8) also acts as a launching pad for the upper section which has its own rocket motor (6). The drawing shows the astronauts carrying out this manoeuvre which they must complete as a first step in returning to Earth. Fig 3 is an entrance hatch. Fig 4 are communications and radar aerials. Fig 5 are directional stability motors which the pilot operates from a single control column. Figs 7 and 10 are the fuel tanks for the different rocket motors.

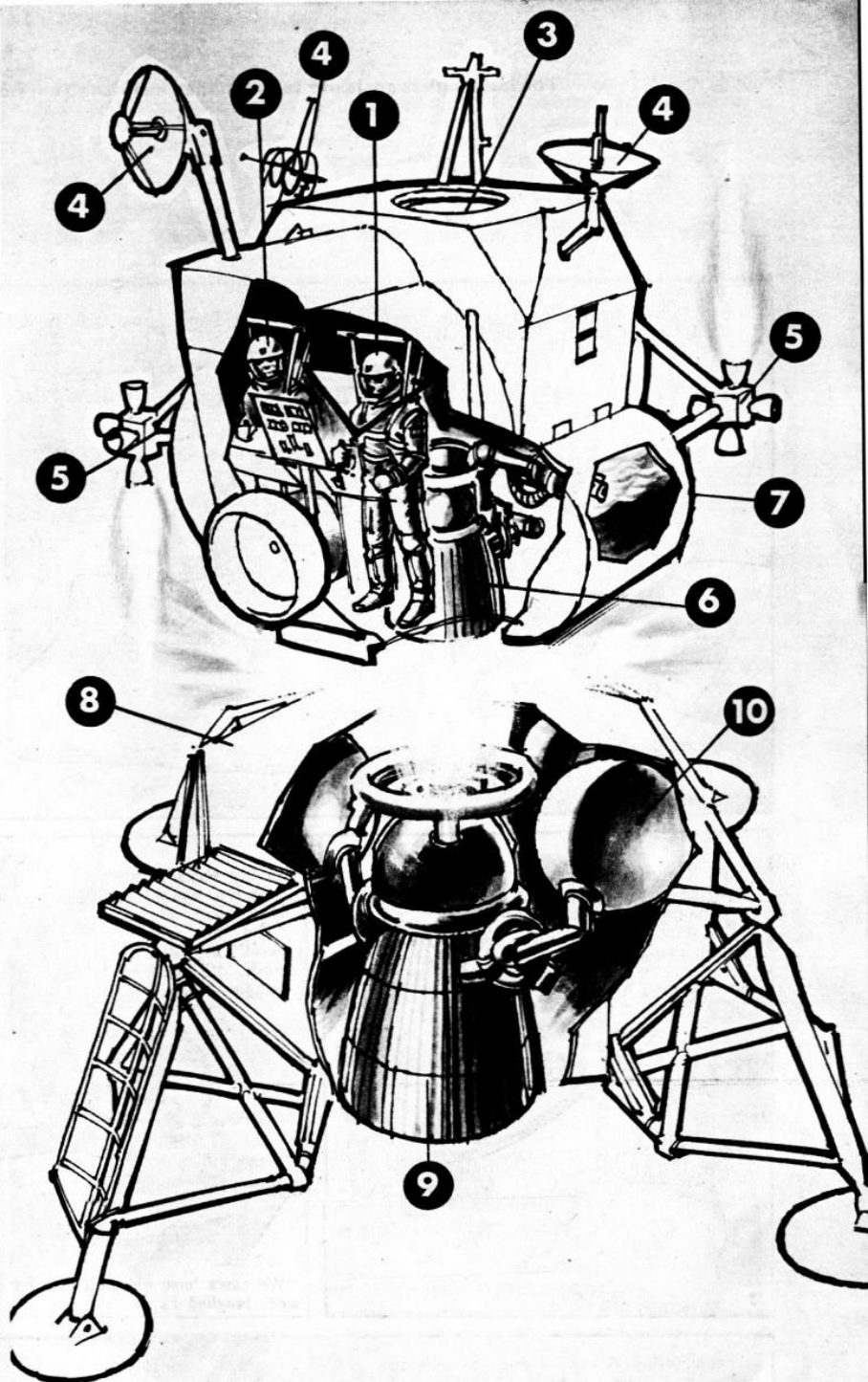




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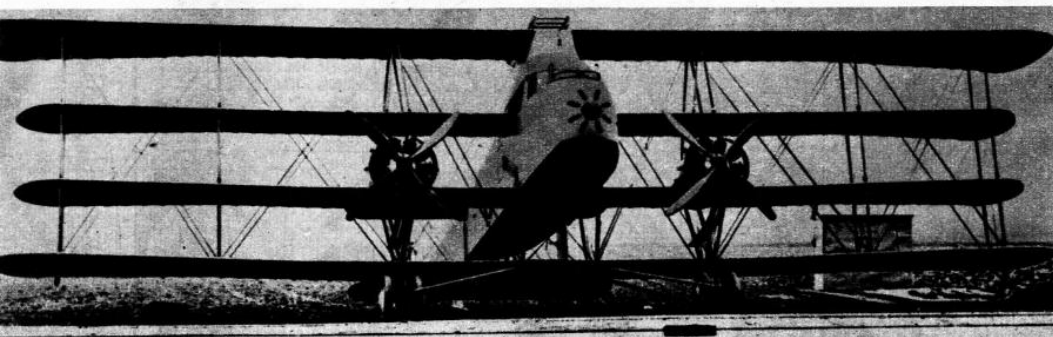
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WEIRD (and wonderful) WINGS!

MAN'S efforts to get himself airborne and stay up in the sky have often resulted in some weird and wonderful flying machines. Many of them were amazingly airworthy in spite of their odd appearance. Some, of course, were failures, while others were only partially successful, but each and every one has played a

part in the fascinating story of flight.

Apart from a few which have been preserved in museums, the only remaining record of these early machines is a photographic one, and this week with the help of RANGER's picture editor I have selected a few of these flying wonders which I am sure you will find interesting.

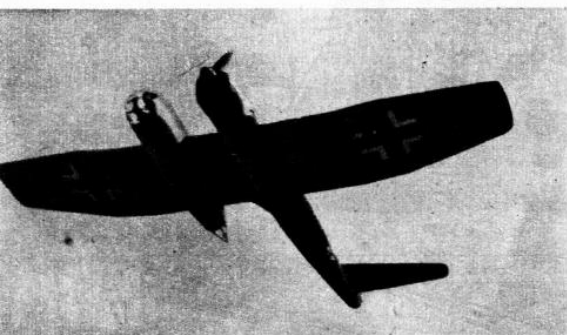


Quite a large number of multi-winged planes were produced during the First World War and some of them, both British and German were flown in combat operations. These, however, were triplanes which Sopwith built for Britain and Fokker for the German Air Force. An early

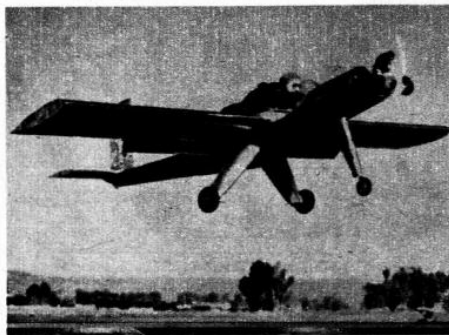
quadruplane built was British and came from Supermarine Ltd., of Southampton. It was called the Night Hawk and was to be used for night patrol work in 1918. One was damaged during trials and the Government stopped any further development. Courtesy "Imperial War Museum"



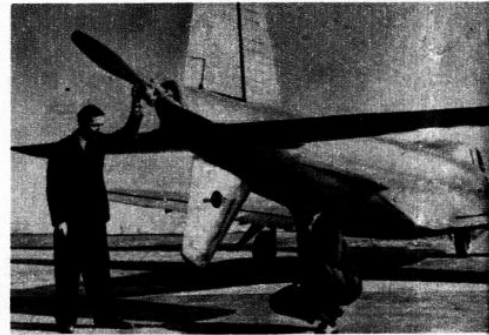
'Le Pou de Ciel', or 'Flying Flea' as it was called in Britain, was produced in 1935 by a Frenchman called Henri Mignet. It was a 'do-it-yourself' plane with a tiny 17 h.p. engine, but proved to be unsafe and after several crashes was abandoned as a project. Courtesy "The Aeroplans"



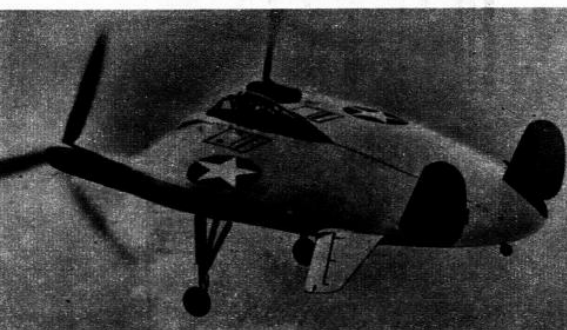
Another German oddity which flew operationally during World War II was this Blohm and Voss 141 B. It was an 'asymmetric' design with the crew in a nacelle which was quite separate from the main fuselage and engine. Maximum speed was 290 m.p.h. Courtesy "Imperial War Museum"



This 'Weebie' was the world's smallest plane in 1949. The whole plane weighed only about as much as the man flying it. Designed by an American called Ken Coward, it could fly at 90 m.p.h. but because he was open to the weather, it was rather uncomfortable for the pilot!



The Douglas Cloudster built by the Douglas Aircraft Company of America was a 'pusher' type machine with the propeller in the tail. Intended for private flying, it had a front compartment like a saloon car. It could carry five people at 200 m.p.h. for 1,100 miles.

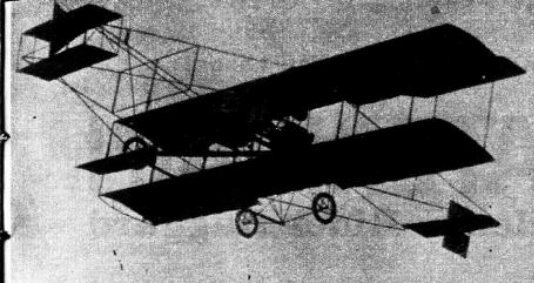


Who said 'Flying Saucers' didn't exist? This United States Navy plane proves that they did! It was one of a number of experimental shapes tried out by the American services and first flew about 1950, but being a military plane no details are available.

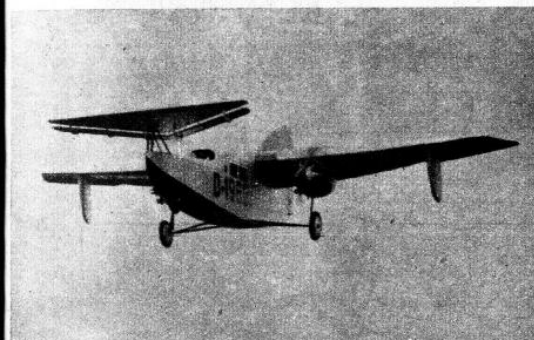


Vertical Take-Off aircraft, although not new, are still in the development stage and this Canadair CL-84, known as a 'tilt-wing' is one of the many designs under investigation. The Canadians have done a great deal of work on this plane which is for use as a short-haul transport plane. Once at a safe height, the pilot tilts the wings level and the machine slowly begins its forward flight. A pair of contra-rotating propellers in the tail give 'lift' at the rear end. (See right-hand picture).

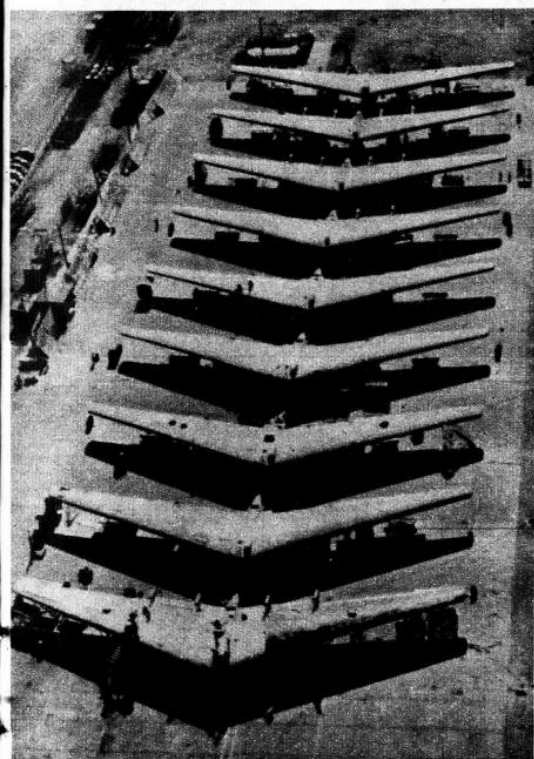




This Curtiss biplane is typical of the very early aeroplanes which flew successfully. It was built in America in 1909 and had a 30 h.p. 4-cylinder engine amidships. Its take-off speed was 25 m.p.h. while its top speed was only 45 m.p.h.

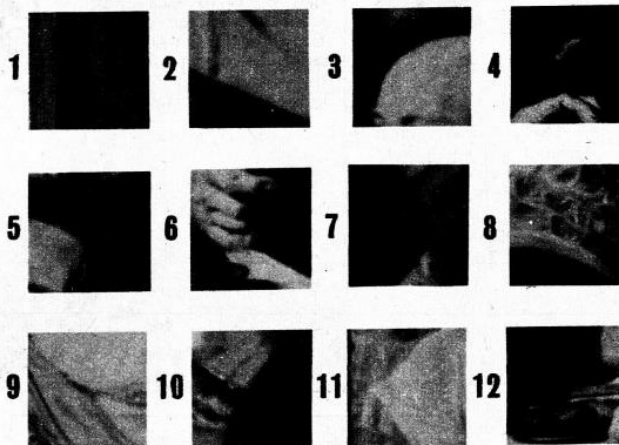


In spite of what you might think, this plane is actually flying towards you. It was another oddity of the 1930s and was a German Focke-Wulf known as the 'Canard'. The forward facing tail unit had the advantage of preventing stalling, but it interfered with the pilot's view. *Courtesy "Flying Review International"*



Because they have no tails or fuselages, these nine 100-ton Northrop Flying Wings fit easily into the space which would take only four normal bombers. These planes flew in 1948 and by 1950, the prop-jet engines were changed for eight pure turbojets which greatly increased their speed. No performance details are available, but they carried a crew of seven for whom special off-duty accommodation was provided.

THE RANGER PICTURE GAME



Here is another famous picture in our RANGER Picture Game. It was painted by Frans Hals, who lived from 1580 until 1666, and is called "Banquet Of Officers".

As you can see, we have divided the picture into 384 squares.

Each one of the 12 little pictures on the left is an enlargement of one of the 384 squares in the big picture.

Now, can you say which of the 12 small squares have been enlarged?

When you have identified them all try the picture game on your chums.

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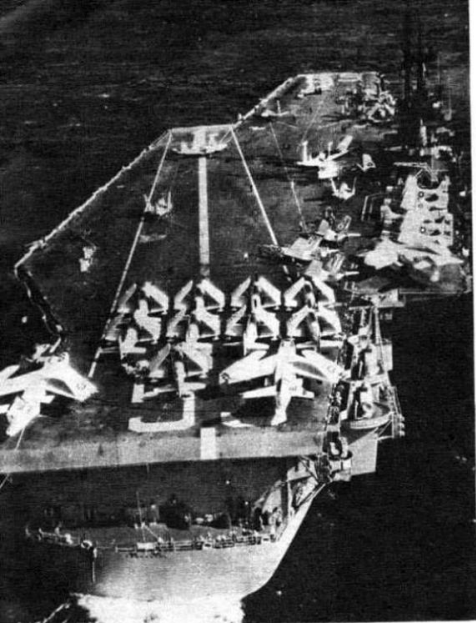


TAKE OFF
FROM THE
**WORLD'S LARGEST
FLOATING AIRPORT!**

See pages 10 and 11

MAY · 7 · 1966 ·

AIRPORT ON THE HIGH SEAS



Above is a photograph of the United States Attack Aircraft Carrier *Forrestal*. This is a stern-on view and shows various bombers and fighter-bombers parked on the flight deck with their wings folded.

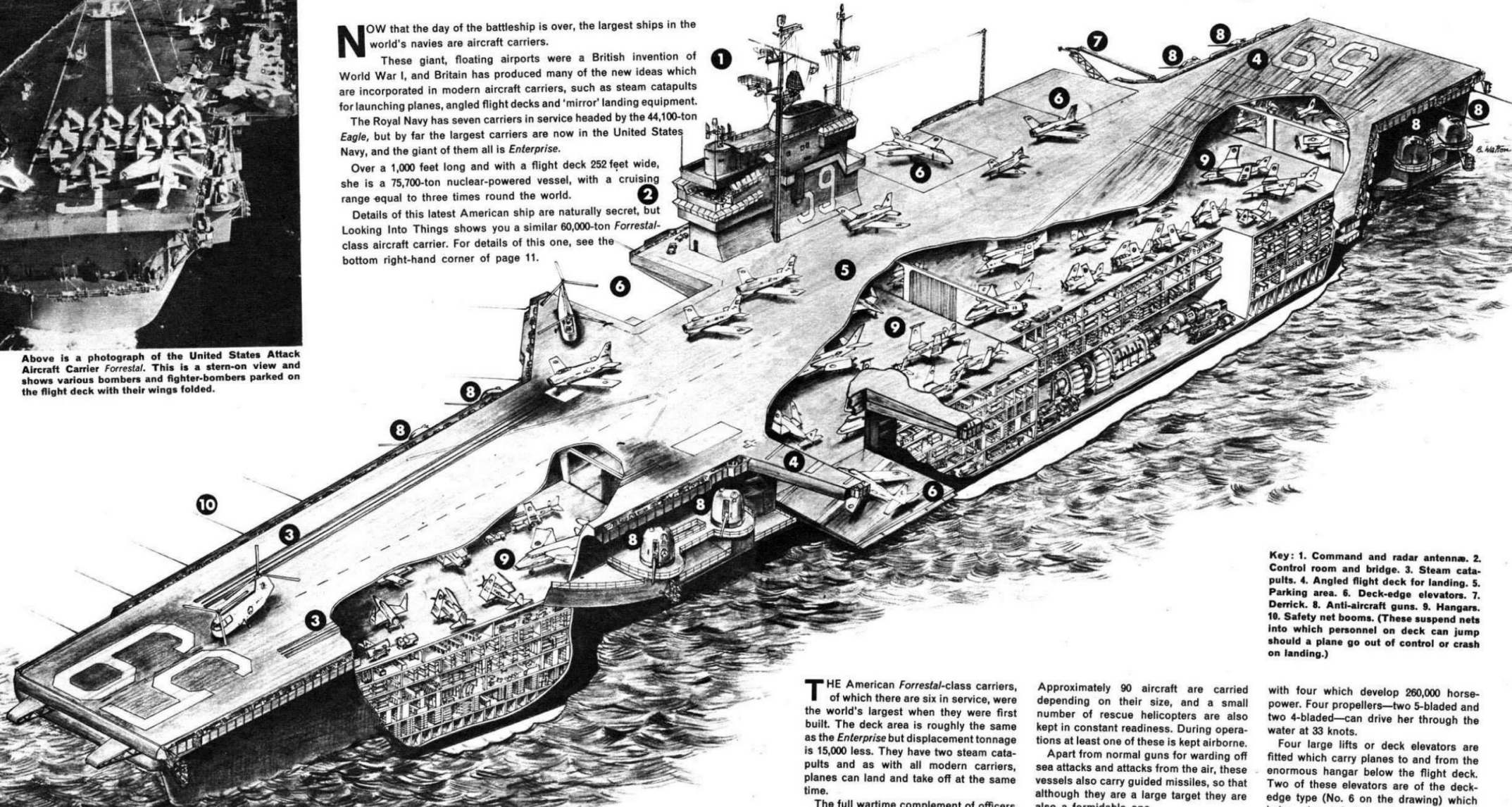
NOW that the day of the battleship is over, the largest ships in the world's navies are aircraft carriers.

These giant, floating airports were a British invention of World War I, and Britain has produced many of the new ideas which are incorporated in modern aircraft carriers, such as steam catapults for launching planes, angled flight decks and "mirror" landing equipment.

The Royal Navy has seven carriers in service headed by the 44,100-ton *Eagle*, but by far the largest carriers are now in the United States Navy, and the giant of them all is *Enterprise*.

Over a 1,000 feet long and with a flight deck 252 feet wide, she is a 75,700-ton nuclear-powered vessel, with a cruising range equal to three times round the world.

Details of this latest American ship are naturally secret, but *Looking Into Things* shows you a similar 60,000-ton *Forrestal*-class aircraft carrier. For details of this one, see the bottom right-hand corner of page 11.



Key: 1. Command and radar antennae. 2. Control room and bridge. 3. Steam catapults. 4. Angled flight deck for landing. 5. Parking area. 6. Deck-edge elevators. 7. Derrick. 8. Anti-aircraft guns. 9. Hangars. 10. Safety net booms. (These suspend nets into which personnel on deck can jump should a plane go out of control or crash on landing.)

THE American *Forrestal*-class carriers, of which there are six in service, were the world's largest when they were first built. The deck area is roughly the same as the *Enterprise* but displacement tonnage is 15,000 less. They have two steam catapults and as with all modern carriers, planes can land and take off at the same time.

The full wartime complement of officers and men, including flying personnel, is 4,142, of which 2,662 form the air wing.

Approximately 90 aircraft are carried depending on their size, and a small number of rescue helicopters are also kept in constant readiness. During operations at least one of these is kept airborne.

Apart from normal guns for warding off sea attacks and attacks from the air, these vessels also carry guided missiles, so that although they are a large target they are also a formidable one.

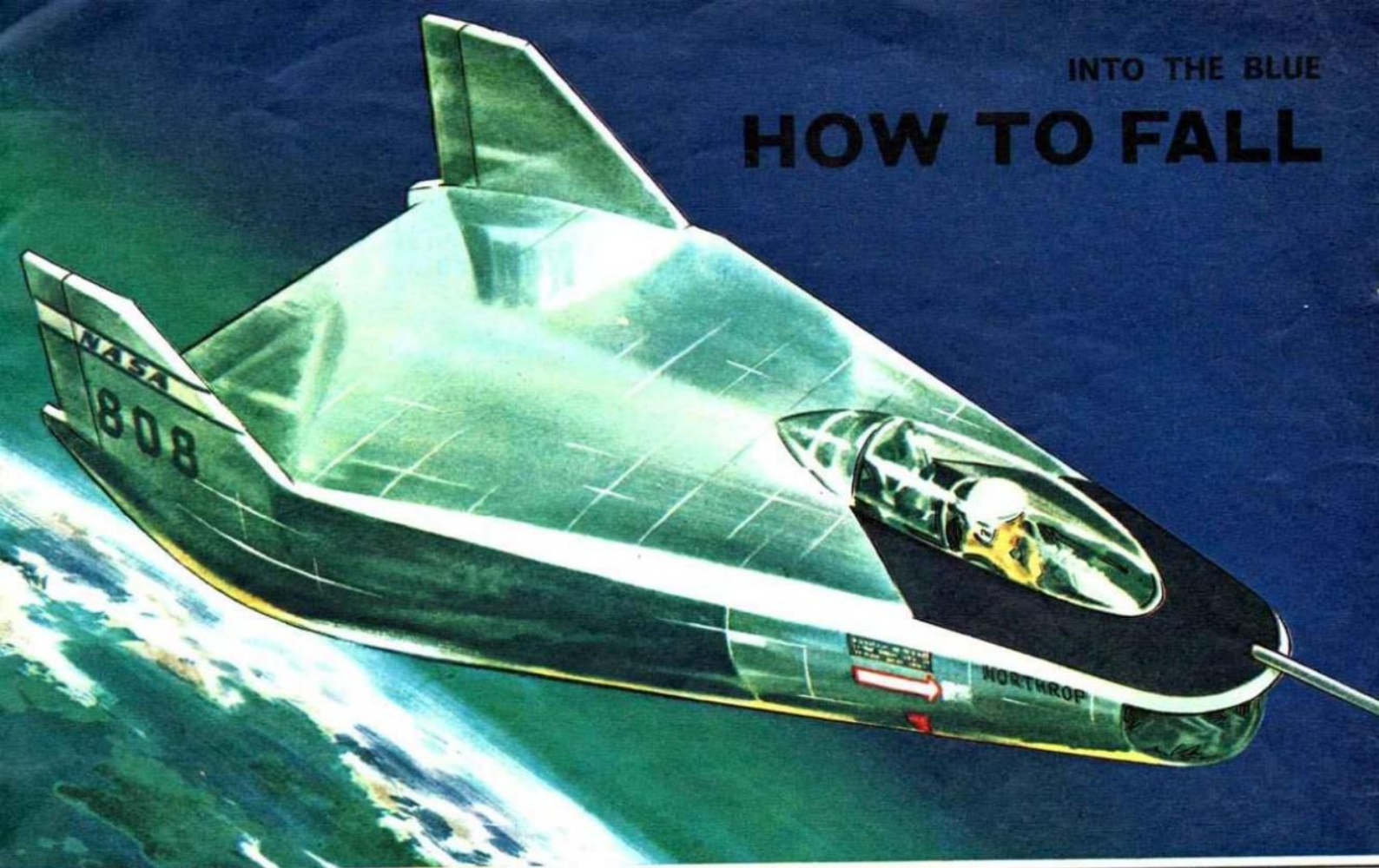
These carriers have conventional electric turbine engines. They are fitted

with four which develop 260,000 horsepower. Four propellers—two 5-bladed and two 4-bladed—can drive her through the water at 33 knots.

Four large lifts or deck elevators are fitted which carry planes to and from the enormous hangar below the flight deck. Two of these elevators are of the deck-edge type (No. 6 on the drawing) which being clear of the main deck, do not interfere with the movement of planes which are landing or taking off.

INTO THE BLUE

HOW TO FALL



SKYRAY—Highway to the Moon

FREE!
IN EVERY
WALL'S
**SKY
RAY**



AN EXCITING
SPACE COLOUR
PICTURE CARD



THE YEAR IS 1981. TIM DAWSON AND HIS PAL BOBBY JACKSON WERE ACCIDENTALLY LOCKED INSIDE THE HOLD OF A UNITED EUROPE MOON ROCKET, AND THEIR ADDITIONAL WEIGHT HAS UPSET THE LUNAR LANDING CALCULATIONS. CAPTAIN DAWSON, TIM'S FATHER, HAS BEEN TOLD HE CANNOT MAKE A SUCCESSFUL LANDING...

OPERATION 'OVERSHOOT': CAPTAIN DAWSON CUT ALL MOTORS...

INSIDE THE HOLD...

THE RETRO-MOTORS HAVE STOPPED! ARE WE DOWN, TIM?

NO... WE'RE STILL WEIGHTLESS! I WONDER WHAT'S HAPPENING?

IT HAD BEEN IMPOSSIBLE TO LAND AT THE BASE... THE CAPSULE'S ORBIT WOULD NOT BRING IT CLOSE ENOUGH FOR A SOFT LANDING UNTIL THE FAR SIDE OF THE MOON...

I'LL HAVE ONE CHANCE ONLY... THERE'S NOT ENOUGH FUEL LEFT IN THE RETRO-ROCKETS TO CORRECT A SINGLE MISTAKE!

I'LL JUST ABOUT MAKE IT!

THE LANDING WAS RUGGED, BUT SAFE ENOUGH. CAPTAIN DAWSON THEN SET ABOUT CHECKING THE CAPSULE... AND OPENED THE HOLD!

HI, CAPTAIN DAWSON!

WHAT...?! SO YOU'RE THE CAUSE OF ALL THE TROUBLE!

SORRY, DAD, BUT...

THE BOYS EXPLAINED HOW THEY HAD BECOME SHUT IN...

BUT THEY'LL SOON SEND OUT HELP FROM EUROPE SEVEN WHEN THEY KNOW WE'RE HERE!

THAT'S JUST IT, TIM! THEY DON'T KNOW WE'RE HERE AND WE CAN'T TELL THEM BECAUSE WE'RE BEHIND THE MOON, HIDDEN FROM THE EARTH AND SCREENED FROM ALL RADIO CONTACT! WE ARE STRANDED!

NEXT WEEK: JOURNEY ACROSS THE MOON!

Join the **SKY RAY MOON FLEET NOW!**

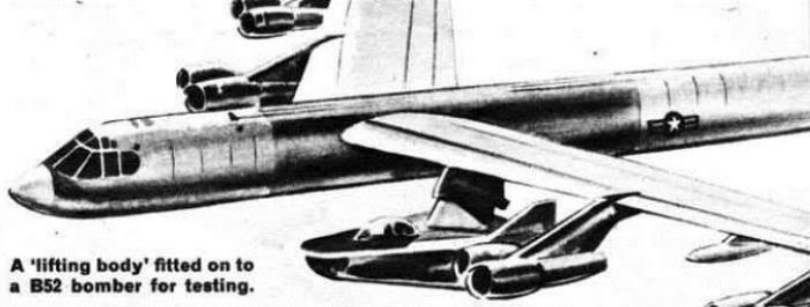
by Test Pilot Neville Duke

FROM SPACE —AND LIVE!

ONE of the major problems of space flight is getting the astronauts back to earth through the atmosphere. As I expect most of you know, the tremendous friction of the air on the surface of any space vehicle causes it to heat up and special materials have to be used which will withstand these high temperatures.

Space scientists are working towards putting manned satellites into permanent orbit round the earth and men working on them will need to return to earth from time to time. To enable them to do this, specially designed machines known as 'lifting bodies' have been made. (One of these was shown in *Your World Today* in RANGER dated April 2nd).

A number of these strange looking 'aircraft' are now being tested by American space engineers. One of them, made by the Northrop Corporation of America, is pictured on the left. They have no wings and the pilots have to control them by means of the tail unit. There is no means of propulsion, and once the 'lifting body' starts its long, high-speed fall to earth, the pilot must guide it on to a flight path which will bring it accurately to the landing area. Landing speed is about 250 m.p.h.

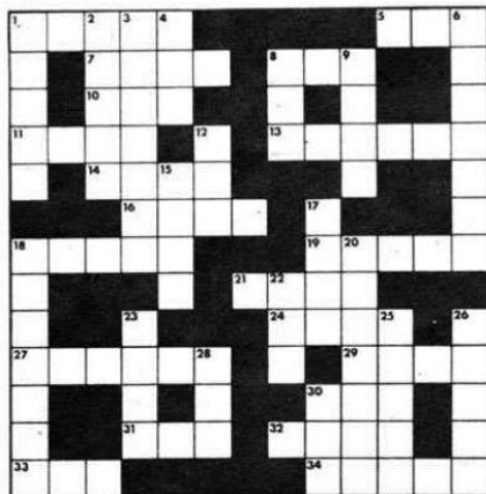


A 'lifting body' fitted on to a B52 bomber for testing.

Here is one of these manned re-entry vehicles with the cockpit canopy open. First tests were carried out by dropping them from beneath bombers at a height of 45,000 feet.



12 MODEL KITS OF A WORLD WAR II TANK TO BE WON!



Full Name
(In block letters)

Age
(years)

Address

Ranger 34

The first 12 readers to send in a correct solution of Ranger Crossword No. 34, will each receive a REVELL model construction kit of a World War II tank. These super tanks are powered by a motor. They are easy to build and will give you hours of fun.

Entries must be received by 13th May, 1966, and the prizes will be awarded for the first 12 correct attempts examined on that date. Prizewinners' names will be announced in RANGER dated week-ending 2nd July, 1966.

Send your completed entry forms (in ink or ball-point please), pasted on a plain postcard addressed to:-

RANGER Crossword No. 34,
1-2, Bear Alley,
Farringdon Street,
London, E.C.4 (Comp.).

CLUES ACROSS:

1. Log of wood.
5. Part of old fireplace.
7. Straight stemmed water plant.
8. Upper limb.
10. Large.
11. Work.
13. Inclined.
14. It passes quickly.
16. We all have one!
18. They fly from a mast.
19. The older of two.
21. Melody.
24. Cease.
27. Sufficient.
29. Put in a letterbox.
30. At sea or on the road!
31. Finish.
32. Lake or pond.
33. Pinch.
34. Totalled.

CLUES DOWN:

1. Beast.
2. Once round the earth.
3. Covers a room.
4. Small barrel.
6. Membraneous bag.
8. Donkey.
9. State of mind.
12. Edge of a dress.
15. A yacht has one.
17. Out of shape.
18. Not British.
20. Spotted cat-like animal.
22. Employ.
23. Entice.
25. Meditated over a book.
26. Could be a horse.
28. For carrying bricks.
30. Refreshing drink.

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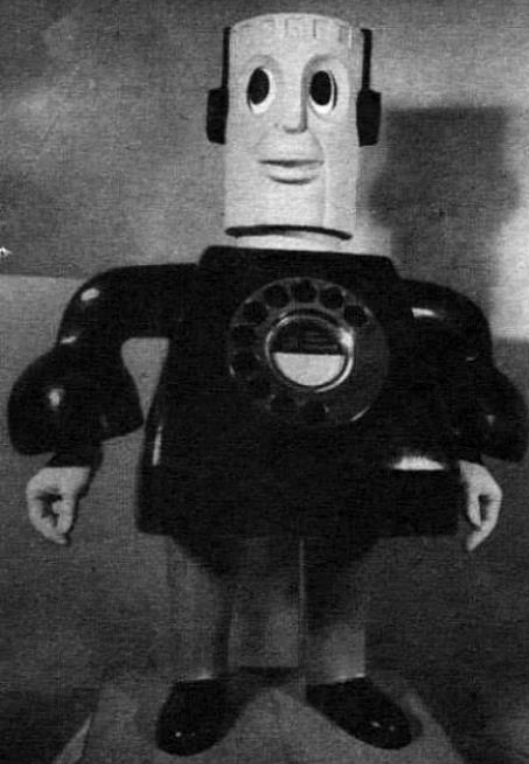
ROBOTS AT YOUR SERVICE !

See pages 2 and 3

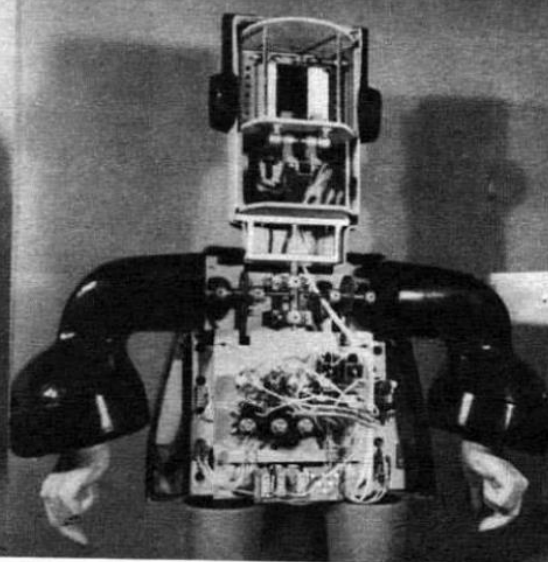


MAY · 14 · 1966

THE REALM



Here is a friendly looking robot called Mr Phone built by the General Post Office. Mr Phone's job is to explain the new telephone all-figure dialling system to customers. He will tell them, "We machine folk have our own thoughts and feelings and language. Treat us right and we'll co-operate. Get mad at us and we won't." It is intended to send him on tour around Britain as the new telephone system is introduced. The right-hand photo shows Mr Phone with his inside open to view.



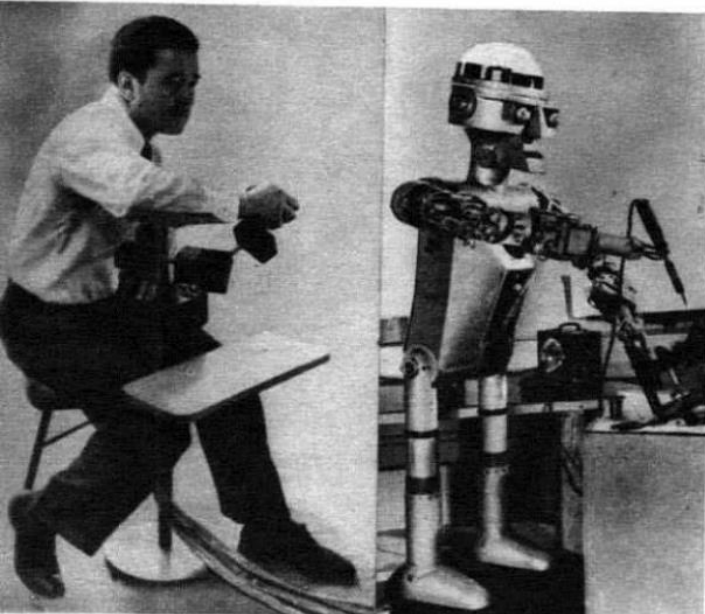
ROBOTS are extremely intricate machines, but this week **LOOKING INTO THINGS** shows you some simple examples and, just for fun, takes a look inside a toy robot.

The Age of the Robot is here to stay. Gradually these mindless machines are becoming a part of modern life.

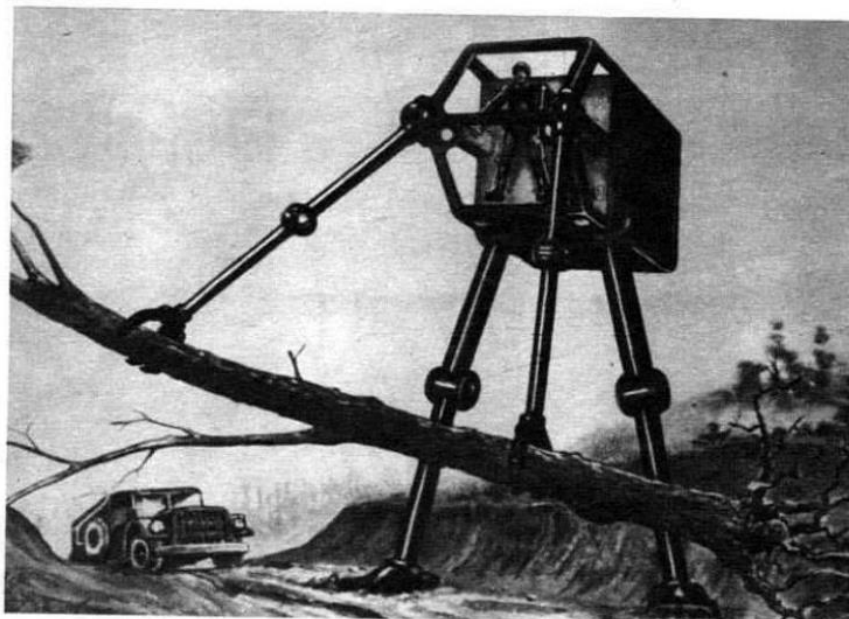
It is not so long ago that the arrival of the robot age was viewed with horror and dread. People feared that machines would eventually destroy all human life. Today, of course, with each week bringing news of these machines achieving something even more fantastic, we tend to look more kindly on robots. We know they can be the friend and servant of man.

Robots do us a great service in fields of science, medicine and technology. Above all, perhaps, they save us time. For example, whereas it would take months for men to

THEY COME FROM MANY COUNTRIES AND



This mechanical man can hammer, saw, drill, mix chemicals, pick up papers, stack boxes and play chess. He is operated by remote control. Each arm contains five tiny actuator motors controlled by 22 push-buttons which also operate the robot's jaw and lips, increase his height six inches, roll the eyes and enable him to bow from the hips. The robot's right arm duplicates every movement of the mechanical arm that is worked at the control unit. He looks terrifying but is quite harmless really.



In a few years to come, when you wake up on a bright summer morning and look out of the window, this is what you might see working in the fields. It is an American invention and is hurriedly being developed for the U.S. Army who consider it has military advantages in transportation. As wheeled and tracked equipment have many difficulties over rugged terrain, it is planned to use this giant robot. The robot is more or less an extension of its driver's arms and legs. Wherever and whenever the driver moves his limbs, the robot simultaneously does likewise. This is just another example of the way in which robots will do the work of humans in the future, increasing their muscle-power to that of giants!

OF THE ROBOT

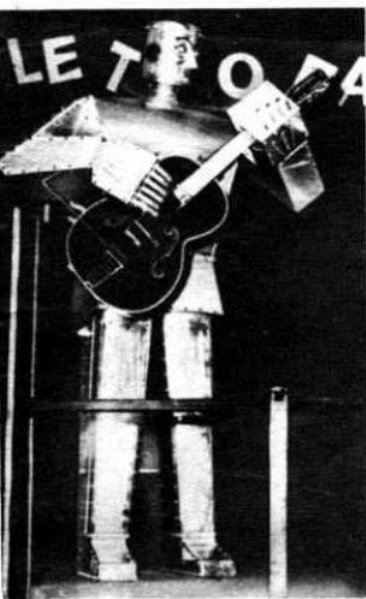
complete a complicated mathematical calculation, the robot can do it in a few minutes.

Some people dream of the day when all work will be done by robots while human beings enjoy a life of leisure. But robots are only as perfect as the men that control them. Look what happened to an employee in Britain when a robot computer made a mistake—he received a tax demand for a million pounds!

Here is the key to the big toy robot on the right that has been taken apart and drawn by our artist: 1, rotating flint wheel—this spins at a very high speed and mechanically has the important job of acting as a governor. Without this, the mechanism would be uncontrollable. 2, flint rubs lightly on flint wheel and sparks when wheel rotates. 3, gear train. 4, main spring. 5, crank working leg and arm. 6, lever working arm. 7, lever working leg. 8, leg hinge. 9, ankle hinge. 10, ratchet on foot wheel allows foot to move forward only and not back.

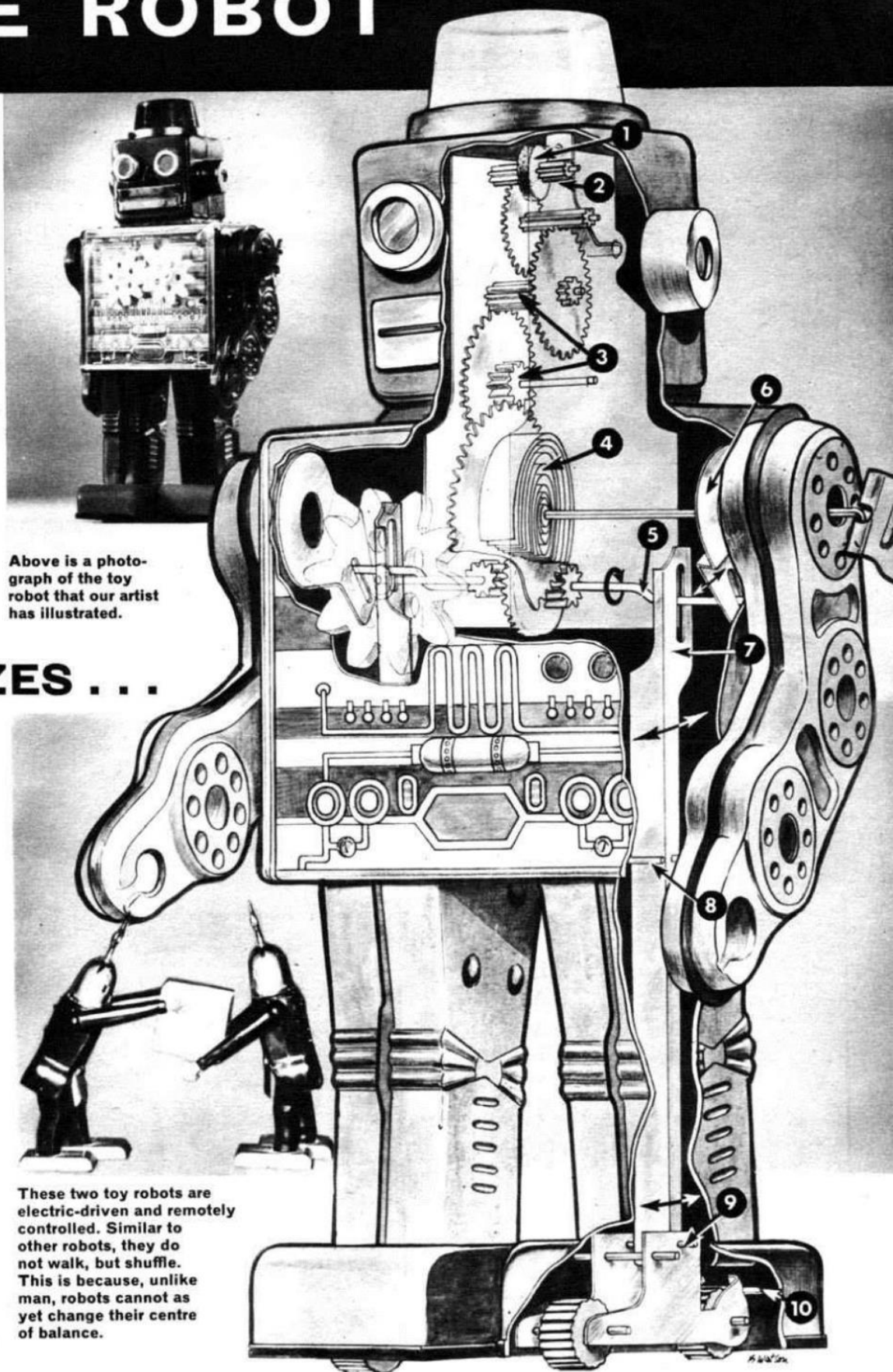
Above is a photograph of the toy robot that our artist has illustrated.

IN MANY SIZES . . .



"And here he is, ladies and gentlemen—Natty Bolt!" We can laugh, but it has already happened. The 'guitarist' above is one of a robot band invented by a Belgian, and can be seen playing in one of the large shops in Paris. They have not made a hit record yet, but who knows—perhaps tomorrow's pop music will be the 'Robot Sound'!

These two toy robots are electric-driven and remotely controlled. Similar to other robots, they do not walk, but shuffle. This is because, unlike man, robots cannot as yet change their centre of balance.



RAILWAY DAYS AND WAYS...

Edited by TV personality and railway enthusiast DAVID NIXON

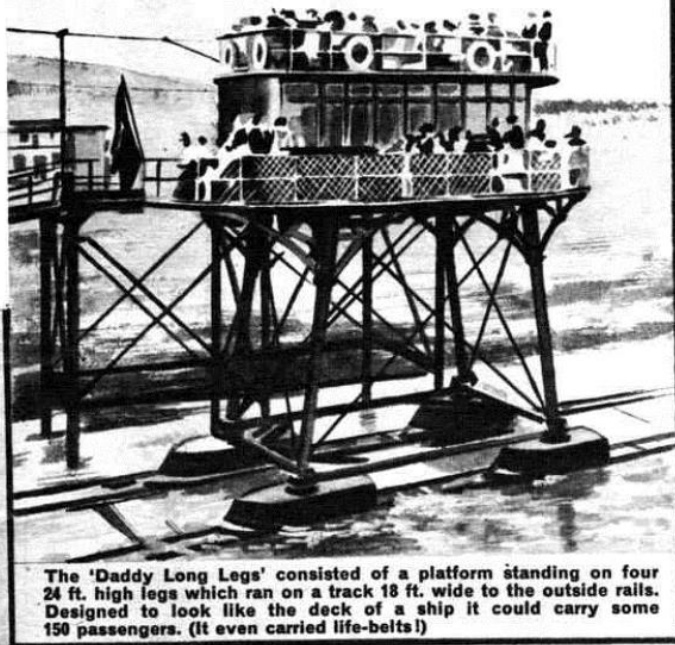
THE TRAIN THAT WENT TO SEA!

WHAT incredibly inventive minds the Victorian engineers possessed!

This funny-looking train was known as the 'Daddy Long Legs', and used to run between Brighton and Rottingdean in 1896. It was driven by four 25 h.p. electric motors, power being supplied by 'overhead' wires that ran to one side of the track. The 2½ miles of track, by the way, disappeared under 15 ft. of water at high tide!

The 'Daddy Long Legs' could do 5-6 m.p.h. and a trip at high water gave all the pleasure of a sea journey without the discomfort of sea-sickness.

Unfortunately, the rails were vulnerable to rough seas and a month after it was opened, the line was badly damaged by a storm. It was repaired for the 1897 summer season, but proved impracticable and was finally dismantled in 1901. What a pity—I would have loved to take a ride on it!



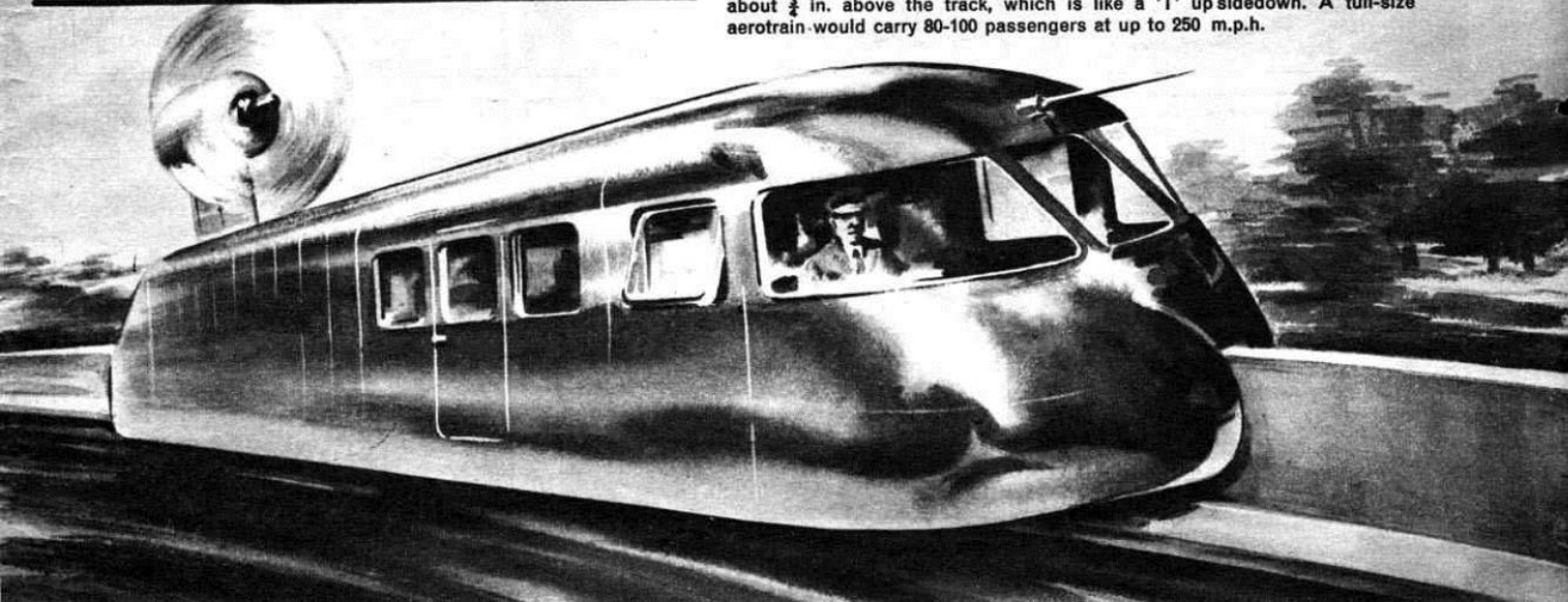
The 'Daddy Long Legs' consisted of a platform standing on four 24 ft. high legs which ran on a track 18 ft. wide to the outside rails. Designed to look like the deck of a ship it could carry some 150 passengers. (It even carried life-belts!)



... AND THE TRAIN THAT GOES BY AIR!

FROM a train that went by sea to a train that goes by air. Here is a test model of a train of the near future designed by the French. It is an aerotrain and works on the same principle as a hovercraft. Instead of wheels, it moves along the track on a cushion of air.

The test model is about two-fifths scale and carries only six passengers. Its gas turbine engine drives a propeller which gives the train a speed of 85 m.p.h. Two 50 h.p. Renault engines drive the blowers which make it ride about ¾ in. above the track, which is like a 'T' upsidown. A full-size aerotrain would carry 80-100 passengers at up to 250 m.p.h.



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THE FIGHT FOR TOBRUK

See pages 2 and 3



MAY 28 1966

A NORTH SEA TRAWLER

THE seas around the British Isles abound with fish and some of the richest fishing grounds are in the North Sea. Many different types of vessels are used to reap this harvest—last week 'Spot the Ships' showed you a Herring Drifter—and now 'Looking Into Things' brings you a detailed cutaway drawing of a North Sea Trawler. Like the men who work on them, these

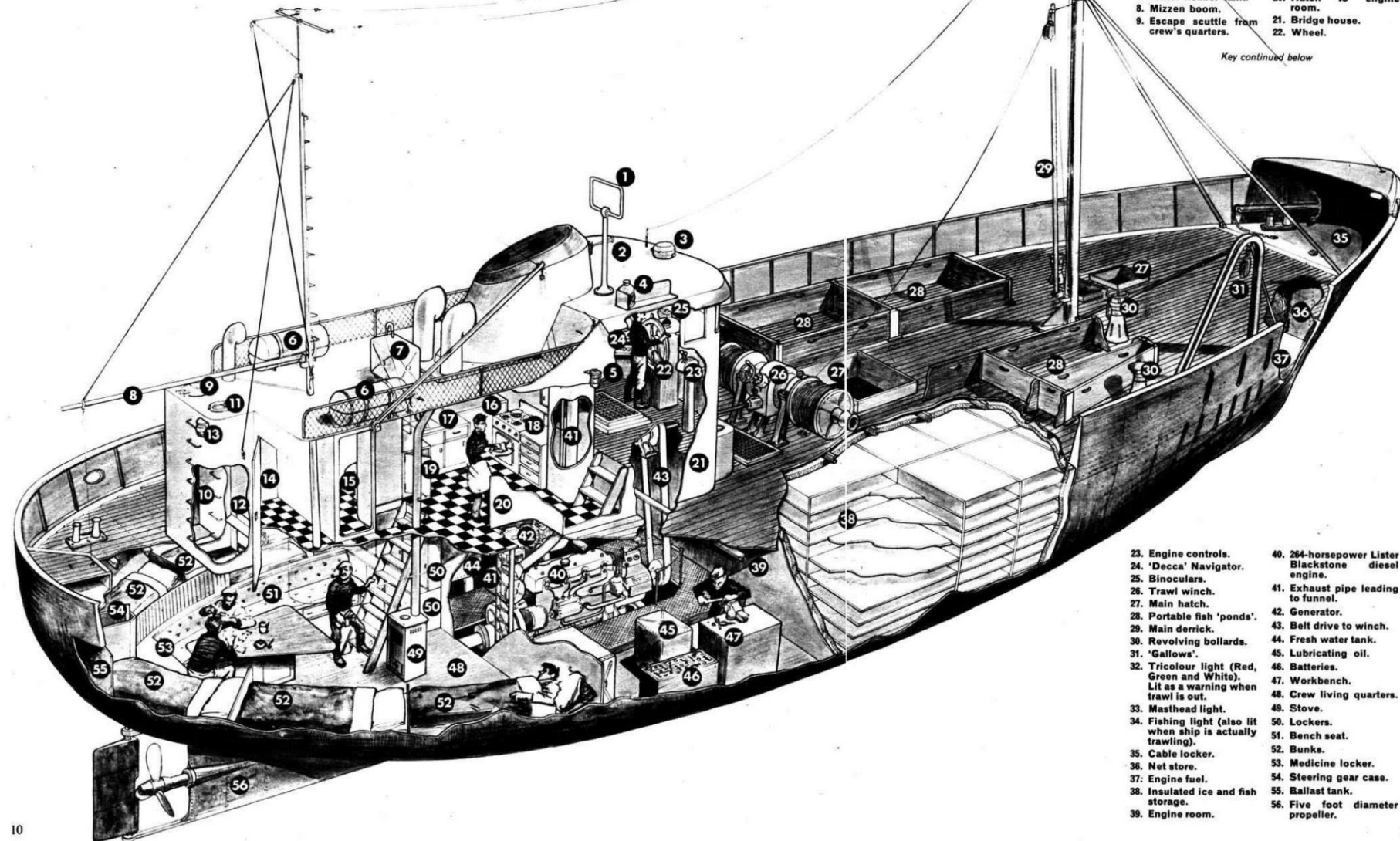
little ships have to be tough and modern trawlers are probably the finest sea boats of their size. The one below is known as a 'Fair Isle' class trawler. It is seventy-three feet long, carries a crew of eight or nine men including the skipper, and usually stays at sea for four or five days before returning to port with its catch.

LOOKING INTO THINGS

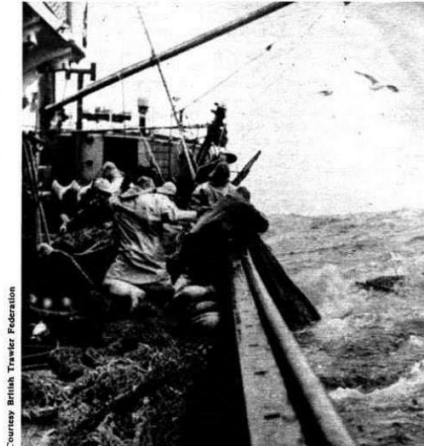
Key:

1. Direction finding aerial loop.
2. Electric warning horn.
3. Roof compass. In this position it is least affected by magnetic interference from the ship. The helmsman reads a reflected image in a mirror.
4. Starboard navigation light.
5. Desk lamp for night work.
6. Eight-man inflatable dinghies.
7. Water header tank.
8. Mizzen boom.
9. Escape scuttle from crew's quarters.
10. Rung ladder to escape scuttle.
11. Coal scuttle.
12. Coal bin for cooking stove.
13. Stern navigation lamp.
14. Storage space.
15. Toilet.
16. Galley.
17. Sink.
18. Cooker with steady rings to hold pots in rough weather.
19. Flare locker.
20. Hatch to engine room.
21. Bridge house.
22. Wheel.

Key continued below



23. Engine controls.
24. 'Decca' Navigator.
25. Binoculars.
26. Trawl winch.
27. Main hatch.
28. Portable fish 'pools'.
29. Main derrick.
30. Revolving bollards.
31. 'Gallows'.
32. Tricolour light (Red, Green and White). Lit as a warning when trawl is out.
33. Masthead light.
34. Fishing light (also lit when ship is actually trawling).
35. Cable locker.
36. Net store.
37. Engine fuel.
38. Insulated ice and fish storage.
39. Engine room.
40. 264-horsepower Lister Blackstone diesel engine.
41. Exhaust pipe leading to funnel.
42. Generator.
43. Belt drive to winch.
44. Fresh water tank.
45. Lubricating oil.
46. Batteries.
47. Workbench.
48. Crew living quarters.
49. Stove.
50. Lockers.
51. Bench seat.
52. Bunks.
53. Medicine locker.
54. Steering gear case.
55. Ballast tank.
56. Five foot diameter propeller.

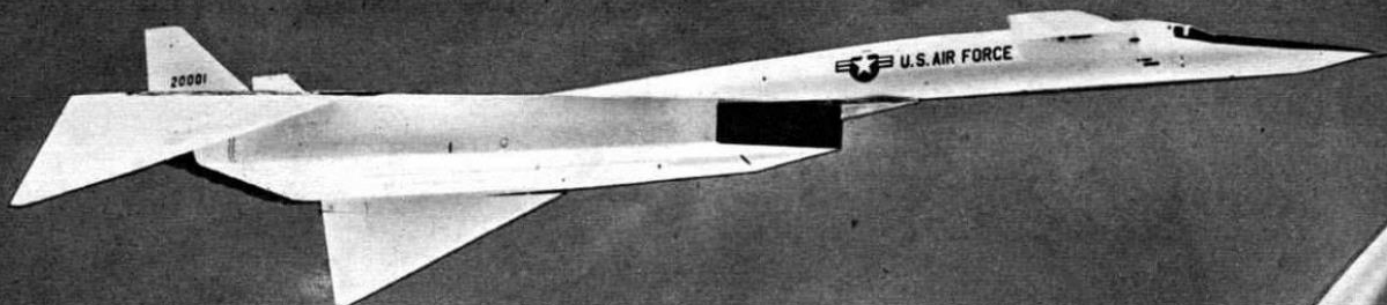


A trawlerman's work is hard...



... and wet, and goes on day and night.





INTO THE BLUE

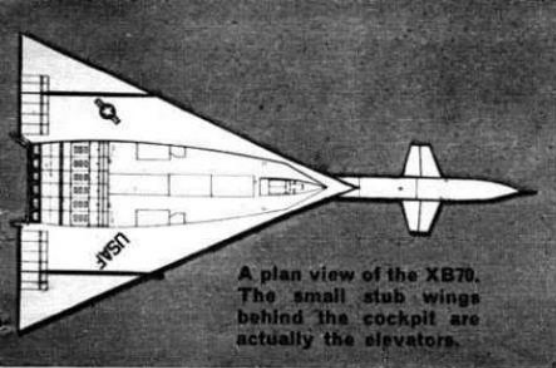
Edited by test pilot NEVILLE DUKE

VALKYRIE

*The World's most
fantastic bomber...*



IN flight, the XB70's long, slender shape closely resembles a giant heron bird. When on the ground, it seems nose-heavy, but the actual centre of gravity balances just in front of the rear main wheels. Looked at from any angle, the Valkyrie is a weird and beautiful aircraft.



A plan view of the XB70. The small stub wings behind the cockpit are actually the elevators.

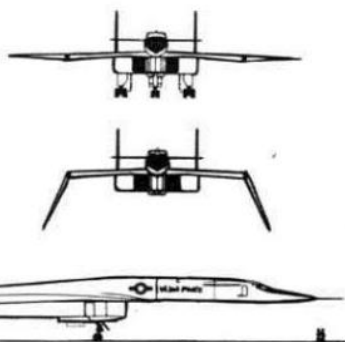
ONE of the most fantastic aircraft ever built has never been put into full production. It is the American Air Force XB70 Valkyrie, a giant supersonic bomber planned to form the basis of the U.S.A.'s bomber force.

Originally it was intended to develop the Valkyrie as a long-range, high altitude bomber, but only two prototypes were completed. Although these reached supersonic speeds, they were outdated by the development of guided missiles and now they are being used only for research purposes.

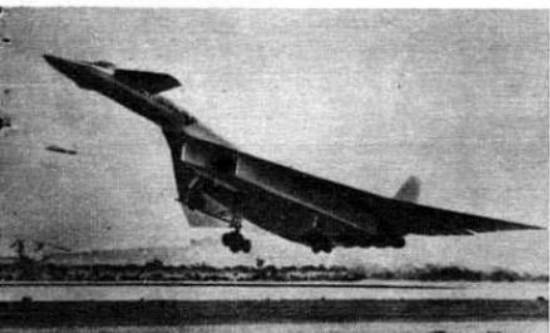
The Valkyrie is the world's heaviest aeroplane, weighing about 236 tons! It is 185 feet long and 30 feet high. It was designed to fly at 1,900 m.p.h. with a range of 6,000 miles and had six turbo-jet engines.

Just to give you some idea of the immense size of this aircraft, the air intakes for the engines are large enough to garage a car!

Unfortunately, mass production would have been so costly that even if the plane had been a success, it would not have been worth continuing, but the knowledge gained from the XB70 will be invaluable to the American aircraft industry for many years to come.



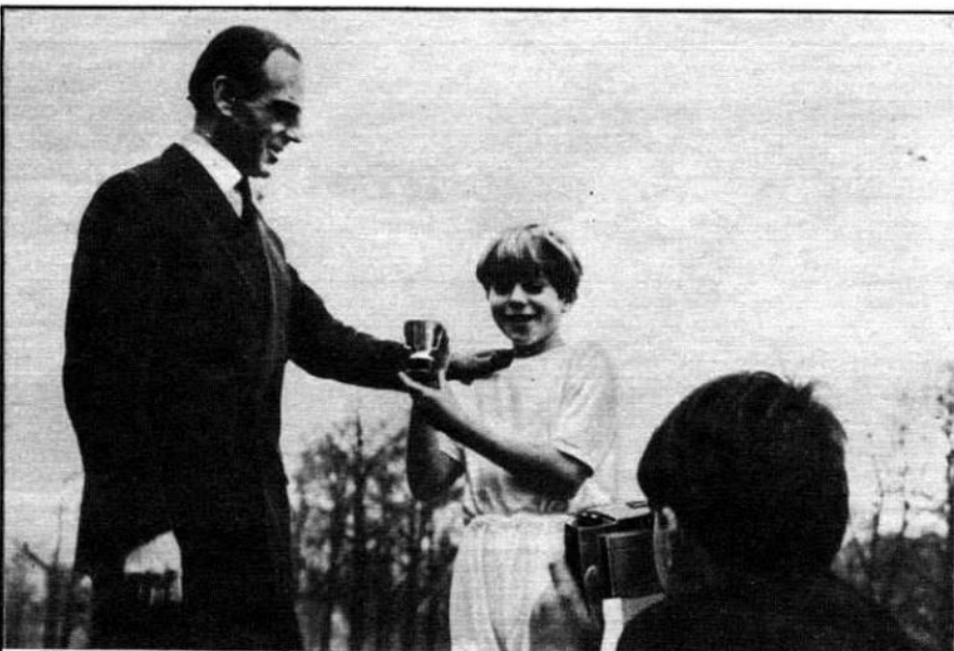
Above, two head-on views and a side view of the Valkyrie. Note the unusual folding wing-tips. At subsonic speeds, the tips are in line with the wing and at supersonic speeds the tips deflect downwards.



RANGER CROSSWORD No. 28

Conjuring sets were awarded to:—

John Barter, Frinton-on-Sea; Richard Beddows, Margate; David Bennett, Meigle; Paul Biddle, London, S.E.21; Jeremy Brookes, Cheadle; Michael Devanport, Birmingham; Michael Dickman, Haverford-west; Charles Gilks, London, N.W.11; Roderick Harpin, Bedford; Christopher Holland, Sheffield; Stephen Hudson, Nottingham; Paul Hulme, Market Drayton; Philip James, Horley; Barrie Lyman, Wolverton; Peter Malna, Leeds; Robert Marshall, London, S.W.2; David Meigh, Sevenoaks; Howard Pidd, Mexborough; Christopher Uridge, Wantage; Geoffrey Vine, London, W.5.



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4. Have a notebook handy at all times to make your notes.

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DESTROY THE SCHARNHORST!

See pages 2 and 3



JUNE · 4 · 1966



From the bridge of the *Belfast*, Admiral Burnett gave an order: "*Belfast* will open fire with star shell." The battle had begun.

SINK THE SCHARNHORST!

Beginning the thrilling story of the Royal Navy's plan to destroy the battleship that was the pride of the German fleet...

by Lieut.-Commander MICHAEL OGDEN, R.N.

ON the evening of Christmas Day, 1943, the sleek and deadly shape of the *Scharnhorst*, one of Germany's most powerful warships, slipped out of a Norwegian fiord.

She passed silently, but not unobserved, into the night. From the shelter of a hillside overlooking the fiord a member of the Norwegian resistance using a powerful pair of binoculars watched her sail.

Having satisfied himself that he had correctly identified the vessel, he made his way back to a solitary log cabin on a mountainside.

From there a message was radioed swiftly back to Naval Intelligence in London:

"Scharnhorst has sailed."

The magnificent battleship was a hunter. Her prey now, as she made her swift way through

the bitter waters of the Arctic, was a British convoy—Convoy JW55B—that was ploughing its way to Murmansk with arms and equipment for the Russian troops.

But the hunter was being hunted. Even as the *Scharnhorst* began to stalk the convoy, a trap was being laid for her destruction.

Admiral Sir Bruce Fraser, on board his flagship the *Duke of York*, was sailing from Iceland towards the convoy.

Fraser suspected that *Scharnhorst* would come out of her lair sooner or later. And he felt that Convoy JW55B would prove the bait to draw the battleship out into the open sea.

As it happened, Rear-Admiral Klüber, the German Naval Commander in North Norway, was reluctant to allow the *Scharnhorst* to sail.

With *Tirpitz* still undergoing extensive repairs, *Scharnhorst* constituted the German Navy's sole major threat in northern waters.

But the orders of Admiral Doenitz, Germany's Naval Commander-in-Chief, had been quite clear:

Enemy is trying to hamper the heroic endeavours of our eastern armies by sending valuable convoys of arms and food to the Russians. We must help. Scharnhorst and destroyers will attack convoy.

So the scene was set. From the British angle success depended upon bringing *Scharnhorst* to action with *Duke of York*: Admiral Fraser was under no illusions about that.

But could Fraser, with his force, reach the convoy in time to prevent the *Scharnhorst*

(Condensed from "*The Battle of North Cape*" by Lieut.-Commander Ogden, R.N., published by William Kimber & Co. Ltd.)

Continued on page 27

TELESCOPE

IN SPACE

EVER since Galileo, the great Italian mathematician, first looked at the heavens through his home-made telescope some 350 years ago, man has struggled to extract more and more secrets from the stars.

Great advances in the design of telescopes have been made over the centuries, and astronomers have added much to their knowledge of the universe, but in spite of everything which modern science and engineering has been able to do, they have failed to overcome the one great handicap to astronomical observation—the Earth's atmosphere.

The wavy curtain of gases which blanket the Earth, and without which life could not exist, make it impossible to obtain a clear, steady picture of stars and planets.

Now, however, with the coming of the Space Age, an

exciting new development is coming along which will solve this problem in one fell swoop. It is the Space Telescope.

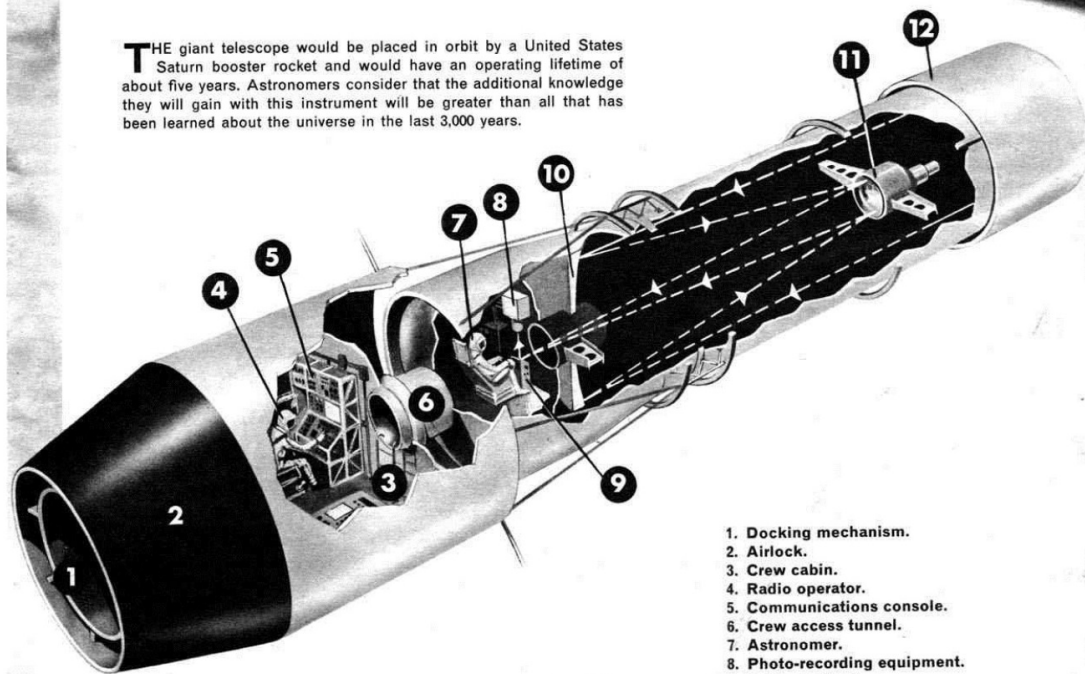
Unmanned optical telescopes have already been fired into orbit outside the Earth's atmosphere by the United States. They were intended to radio their observations back to Earth through their television cameras. These have not so far been very successful, but soon a giant manned Space Telescope will be hurled into orbit and will scan the heavens unhampered by the watery effect of the atmosphere. This week Looking Into Things brings you an artist's impression of what this remarkable instrument will look like as it floats in space 200 miles above the globe.



HIGH above the Earth's atmosphere, the huge 12-ton reflecting telescope will circle the globe. Once in position it will be kept supplied by small spacecraft sent up at regular intervals.

- A. Docking area for visiting spacecraft.
- B. Pressurized living quarters.
- C. Solar panels.
- D. Batteries and fuel tanks.
- E. Communications aerial.
- F. Barrel of telescope.
- G. Observation chamber.
- H. Attitude jets.

THE giant telescope would be placed in orbit by a United States Saturn booster rocket and would have an operating lifetime of about five years. Astronomers consider that the additional knowledge they will gain with this instrument will be greater than all that has been learned about the universe in the last 3,000 years.

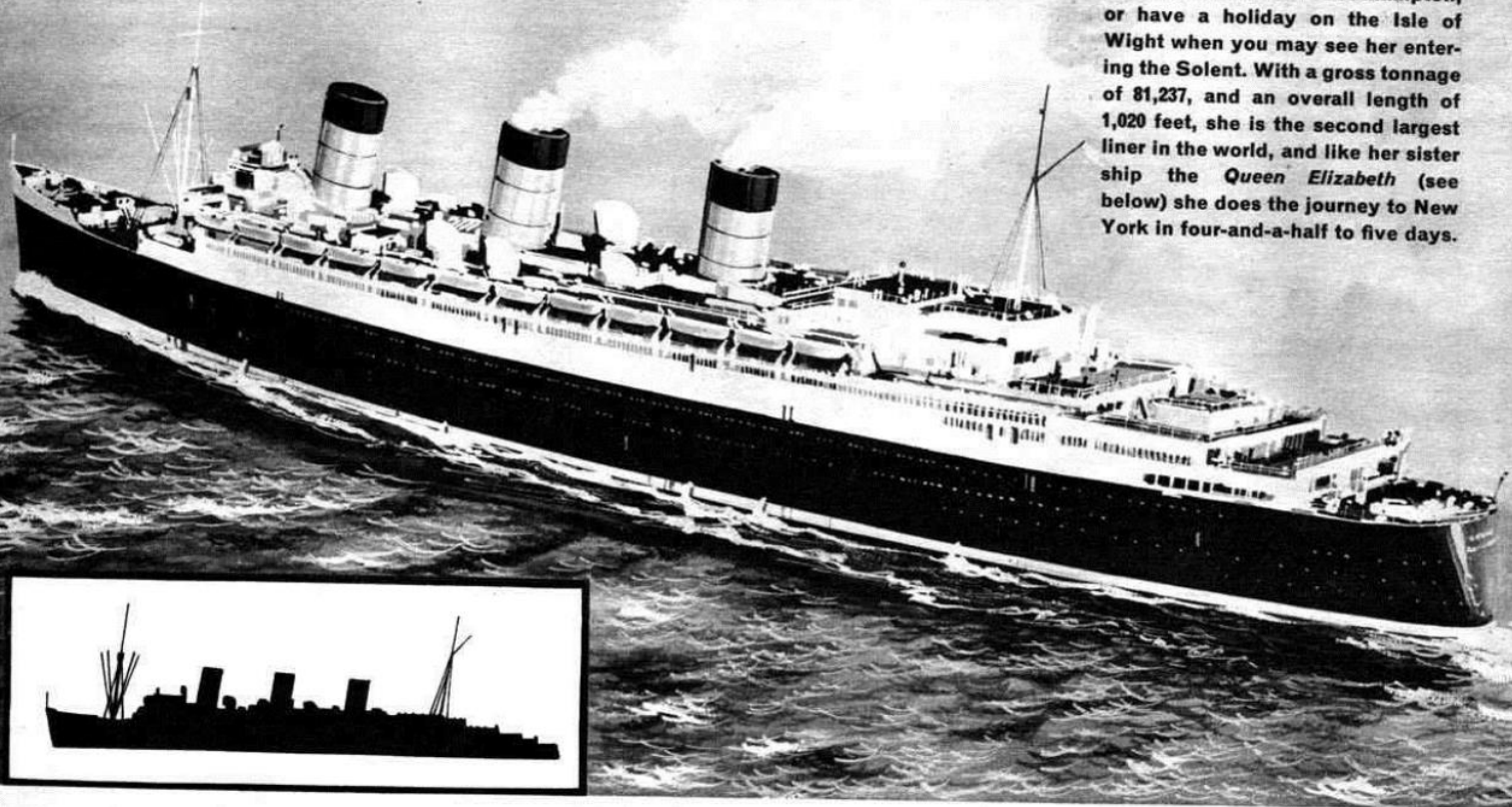


- 1. Docking mechanism.
- 2. Airlock.
- 3. Crew cabin.
- 4. Radio operator.
- 5. Communications console.
- 6. Crew access tunnel.
- 7. Astronomer.
- 8. Photo-recording equipment.
- 9. Folding mirror.
- 10. Primary mirror.
- 11. Secondary mirror.
- 12. Extendable earth-shade containing folding doors.

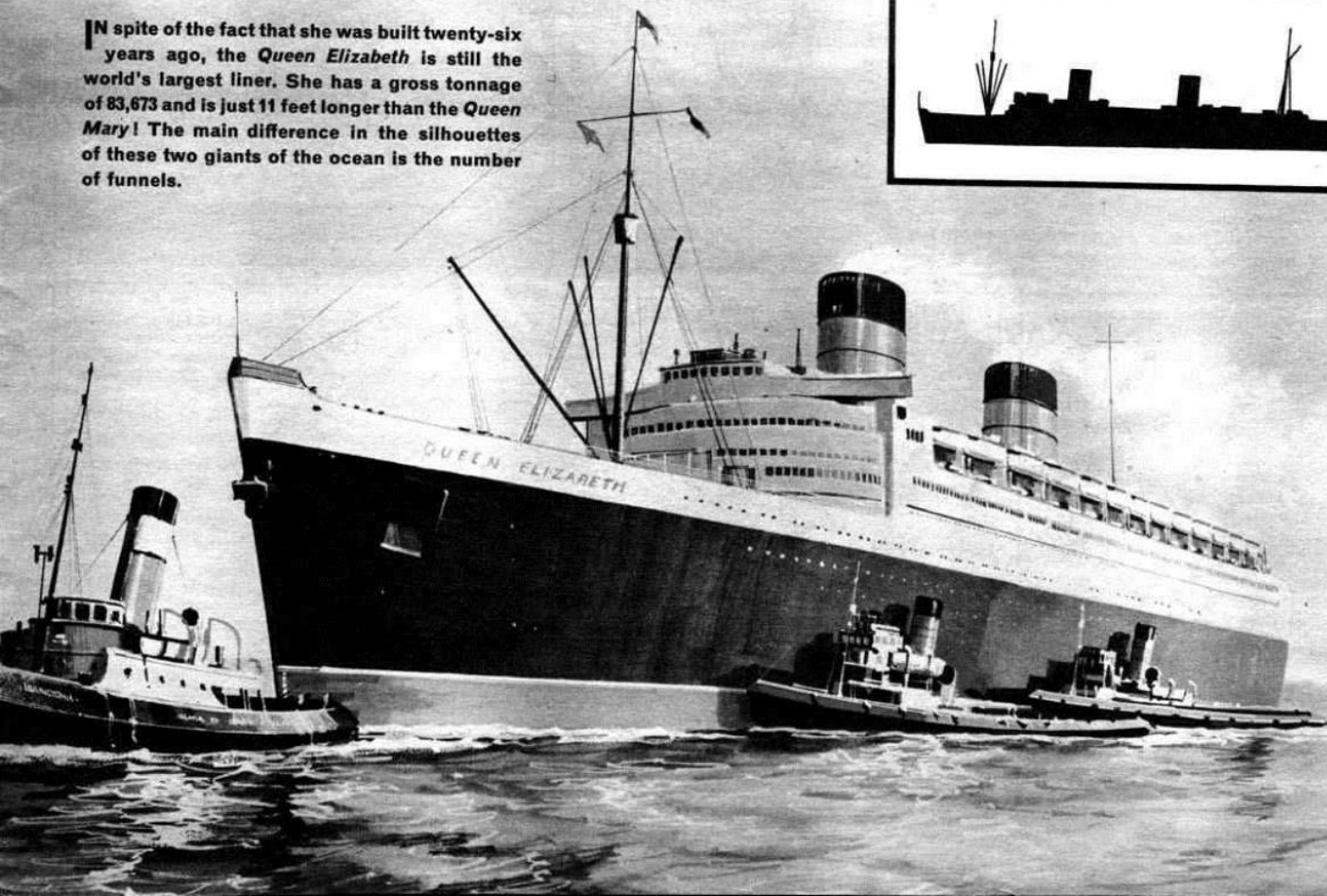
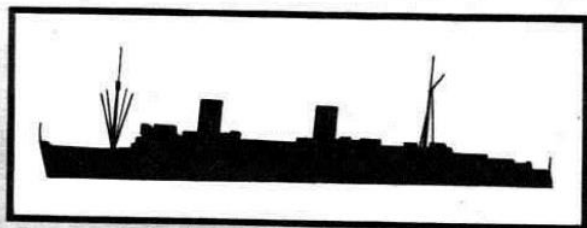
With his existing telescopes man can see from two to three billion light years into space, or into the history of the universe, because it took that long for the light we can see now to reach us. The manned orbital telescope could increase this by as much as ten times, so that astronomers could look back 20 billion light years, and who knows what incredible secrets that may reveal?

SPOT THE SHIPS

THE *Queen Mary* is one of the world's most famous ships, but you are not likely to spot her unless you live in or around Southampton, or have a holiday on the Isle of Wight when you may see her entering the Solent. With a gross tonnage of 81,237, and an overall length of 1,020 feet, she is the second largest liner in the world, and like her sister ship the *Queen Elizabeth* (see below) she does the journey to New York in four-and-a-half to five days.



IN spite of the fact that she was built twenty-six years ago, the *Queen Elizabeth* is still the world's largest liner. She has a gross tonnage of 83,673 and is just 11 feet longer than the *Queen Mary*! The main difference in the silhouettes of these two giants of the ocean is the number of funnels.



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**BUILD YOUR
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JETLINER**

See pages 24 and 25

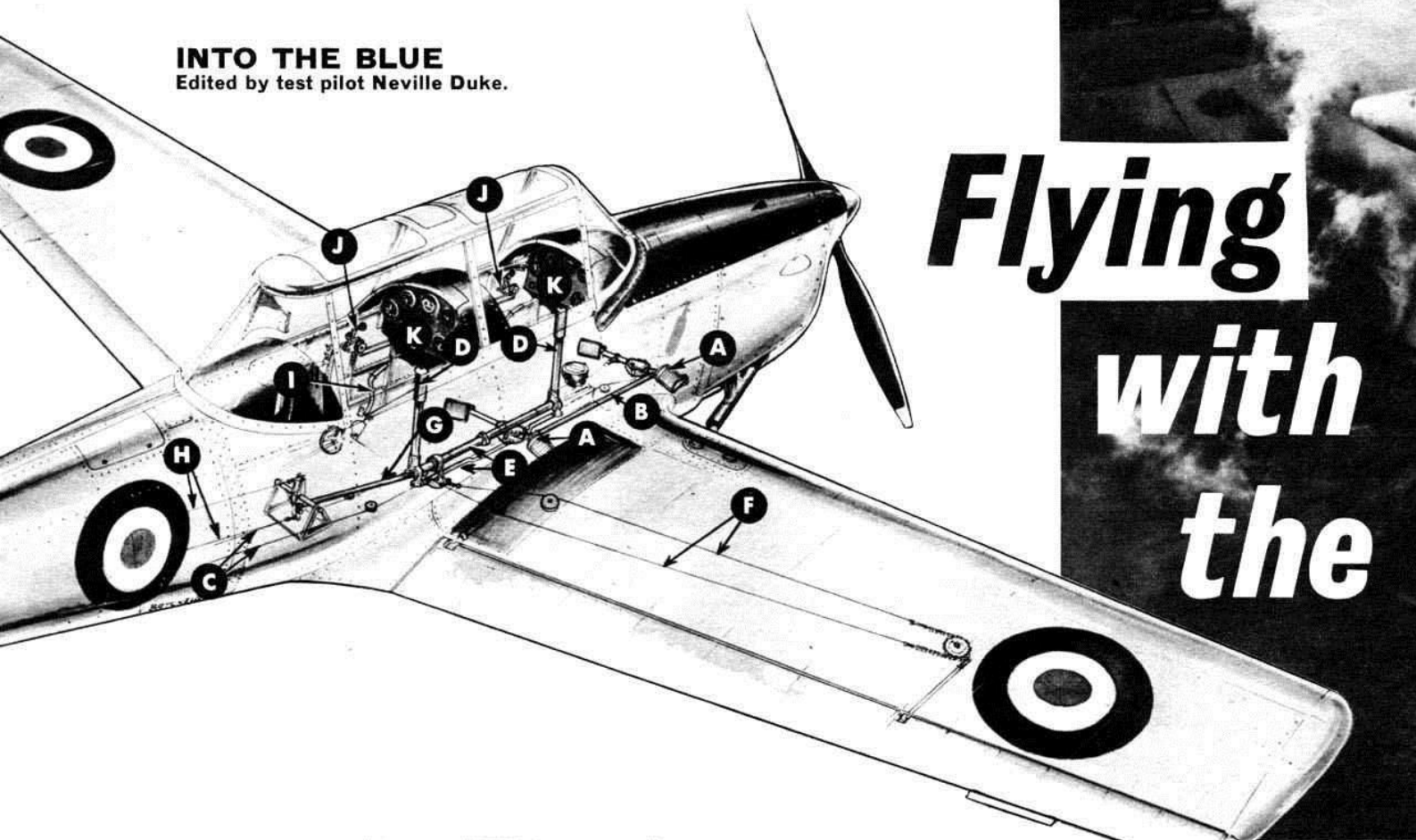


JUNE · 11 · 1966

INTO THE BLUE

Edited by test pilot Neville Duke.

Flying with the



Key:-

- A Rudder pedals
- B Rudder dual control connecting rod
- C Rudder wires
- D Control columns
- E Dual control connecting rods
- F Aileron wires
- G Elevator connecting rod
- H Elevator wires
- I Brake handle
- J Mixture and throttle control
- K Instrument panels

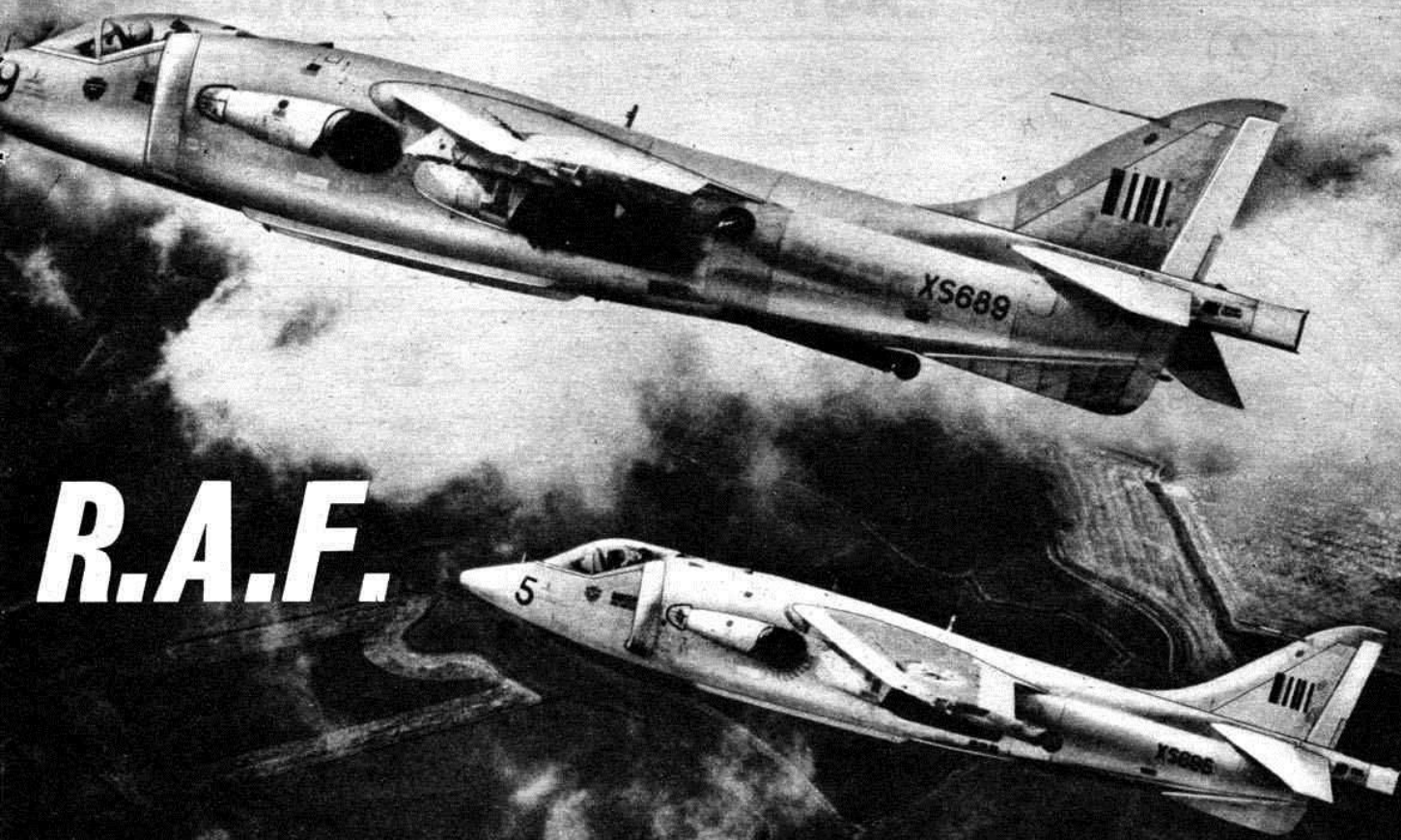


CIVIL airline pilots are trained initially in much the same way as pilots in the Royal Air Force, and here you see a pupil pilot at a civil flying school undergoing instruction in a Chipmunk.

After a certain number of hours flying in these little aircraft and after experiencing that most thrilling moment in any pilot's life—his first solo flight, the pupil will pass on to flying larger, multi-engined planes. Here you see the trainee waiting to take off with his instructor sitting behind him. Right: A Chipmunk in flight.



R.A.F.



Two Kestrels of the R.A.F. in full forward flight. The Kestrel was the world's first operational vertical take-off aircraft.

FLYING with the supersonic fighters and giant nuclear bombers of the R.A.F. calls for a high degree of skill and courage. Super fitness, both mental and physical, is needed, together with an intensive and carefully planned course of training.

The Royal Air Force was formed in 1918 from a combination of the old Royal Flying Corps and the Royal Naval Air Service (The Fleet Air Arm was formed later), and since that time many thousands of pilots and other air crew have passed through its famous flying schools.

Men who want to fly with the R.A.F. to-day, first go to an Air Crew Selection Centre where they are examined by people who are experts at deciding whether a man will make either a fighter pilot or a bomber pilot, or whether he is suitable to form part of the crew of a plane.

Once over this hurdle, would-be flyers are sent either to an Initial Training School, or to the Royal Air Force Training College at Cranwell if they have been chosen for training as officers.

At the Initial Training School, fifteen weeks of ground instruction is followed by five weeks of primary flying training during which 30 hours are flown in Chipmunk aircraft.

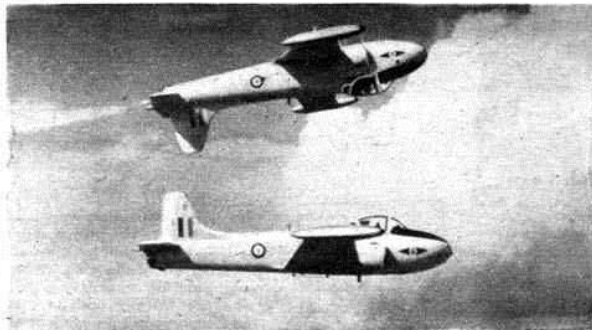
This is followed by a 45 week course at a Basic Flying Training School which includes 145 hours flying in a Jet Provost. If they pass this stage they are then 'streamed' for further training on either fighter, bomber, transport or maritime aircraft or helicopters.

Students finally receive their 'wings' when they have passed a 70-hour course of flying lasting 24 weeks at an Advanced Flying Training School where they fly the fast, jet-powered Gnats. Those selected for transport aircraft complete a similar course at a school equipped with Varsity aircraft. Helicopter pilots are also trained at a separate school.

Two Jet Provost T.Mk 4 aircraft of the Red Pelicans, R.A.F. Central Flying School, at Little Rissington, Glos., carry out a tricky manoeuvre by flying back-to-back. The Jet Provost trainer is a two-seater with a top speed of 410 m.p.h.



Even fully trained pilots who have been posted to a squadron have to be re-trained when they move to a squadron which flies different aircraft, such as the Hawker Siddeley Kestrel. The Kestrel is a vertical take-off strike-reconnaissance aircraft which can also fly faster than sound in level flight.

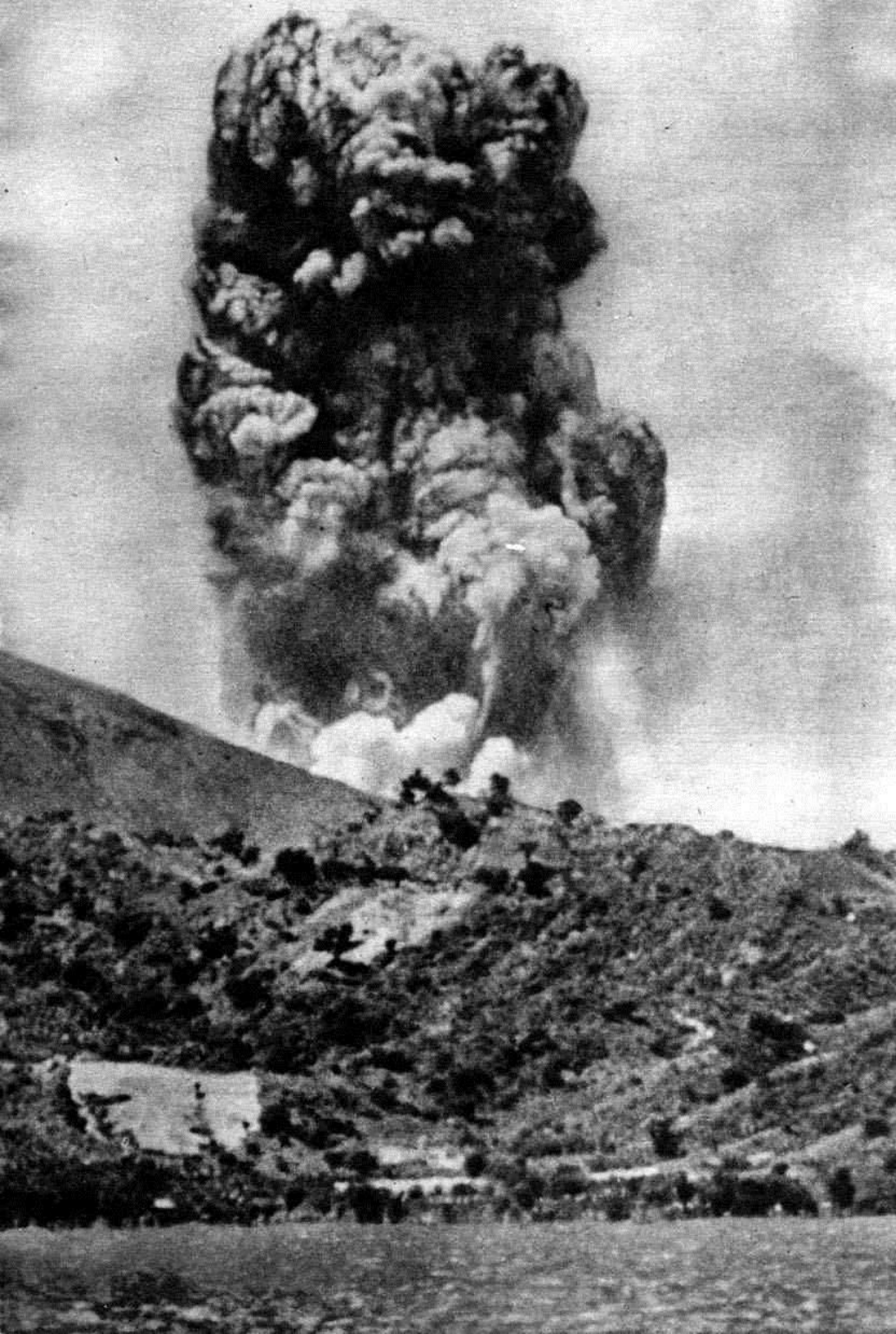


Trainee pilots at an Advanced Flying Training School line up with their Gnat T.Mk 1 trainers. The speedy little jet is very popular with instructors and pupils. The Gnat has a top speed of 600 m.p.h. and in a shallow dive it can exceed speed of sound. With under-wing tanks it has an 1,800 mile range.



FAR AWAY PLACES - THE PHILIPPINES

With a thunderous roar a new volcano suddenly erupts over an island near the Philippines in the Pacific.



Below: A now homeless islander walks on the slopes where boiling lava once flowed, burning everything in its path.



THE

ATENSE, thunderous atmosphere hung over the small island of Taal in the Philippines. Suddenly the island shook and trembled, and a two square mile section of its coastline disappeared into the surrounding water.

In its place rose a steaming, bubbling volcanic crater, 700 feet across, belching smoke and flames two miles into the sky. Thus, on September 28th last year, began an eruption which was to devastate the island and cause the evacuation of 35,000 people from the surrounding areas.

Although Taal was a volcanic island, it had done no more than rumble uneasily once or twice since 1911, and was officially listed dormant.

Satisfied that the volcano had roared for the last time, about 1,000 people lived on its barren slopes, scraping a living from cattle raising and growing coconuts and bananas. So assured were they that when the old volcano began to rumble again on the day before the catastrophe, no one paid any attention.

But by two o'clock the next morning, just half an hour before the first eruption, the farmer-folk of Taal were beginning to get uneasy. Dogs had started barking, and pigs squealing, early in the morning, and many people, feeling that something was wrong, began to flee to the mainland. For many of those who were left it was already too late.

For Taal, once a favourite tourist attraction, now began to rock in the clutches of the seething volcano. Geysers of boiling mud spouted 1,000 feet into the air, and red hot volcanic rock and ash showered the island, settling in burning layers of 60 feet thick in some places. Somehow the volcano formed a thunderstorm around itself, and the lightning was so heavy that observers in aeroplanes and helicopters could not get within three miles of the crater.

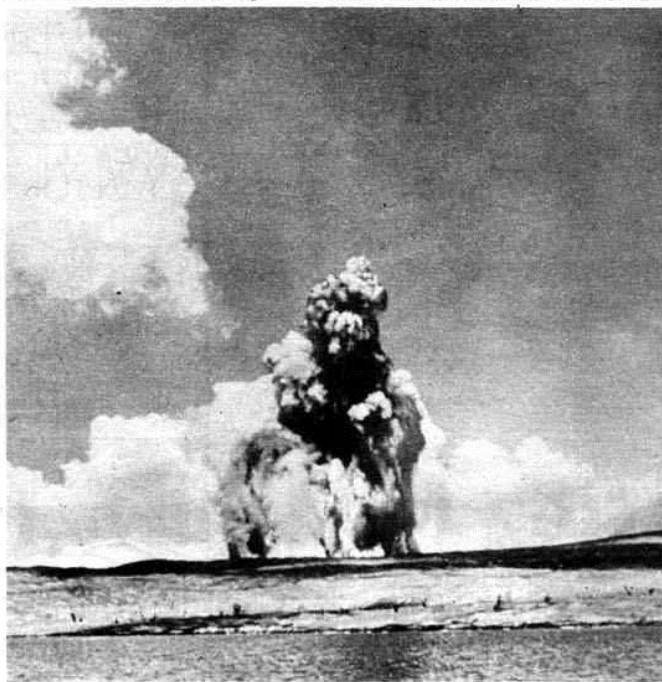
For two days the volcano waged its war of destruction, and the boiling lava poured down the slopes crushing houses and trees. Then, slowly, it began to cool off.

One by one the homeless islanders returned to look at the bare, flat expanse of hardened lava where once fat cattle had grazed upon green meadows.

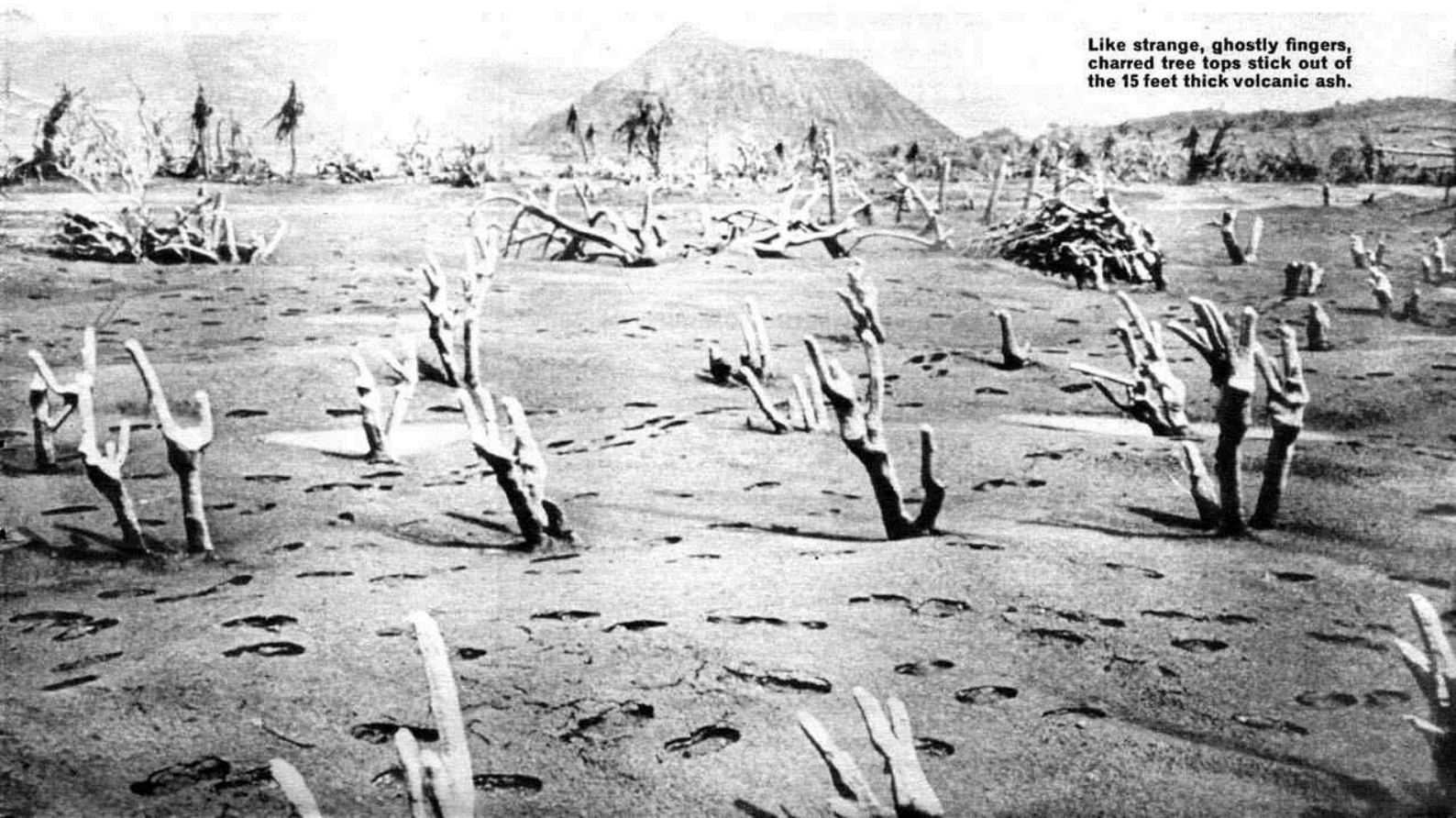
Then the people of Taal began the painful task of rebuilding the island they loved.

Below: A column of hot volcanic ash, mud and sand bursts 500 feet into the sky.

Right: After the eruption, the dejected islanders search the debris for the remains of their belongings.



ISLAND THAT EXPLODED



Like strange, ghostly fingers, charred tree tops stick out of the 15 feet thick volcanic ash.

TELEPHONE LINES UNDER THE OCEAN

HER Majesty's Telegraph Ship *Monarch* is one of the largest cable-laying ships in the world, and was the first ship to lay a telephone cable across the North Atlantic Ocean. The cable runs between Scotland and Newfoundland, and other shorter lengths complete the link with Canada and the United States of America.

A British Post Office invention called a 'repeater' which automatically amplifies the voice signals sent along the cable, has made telephone conversations possible across thousands of miles of undersea cable. Before this, only Morse Code signals could be sent.

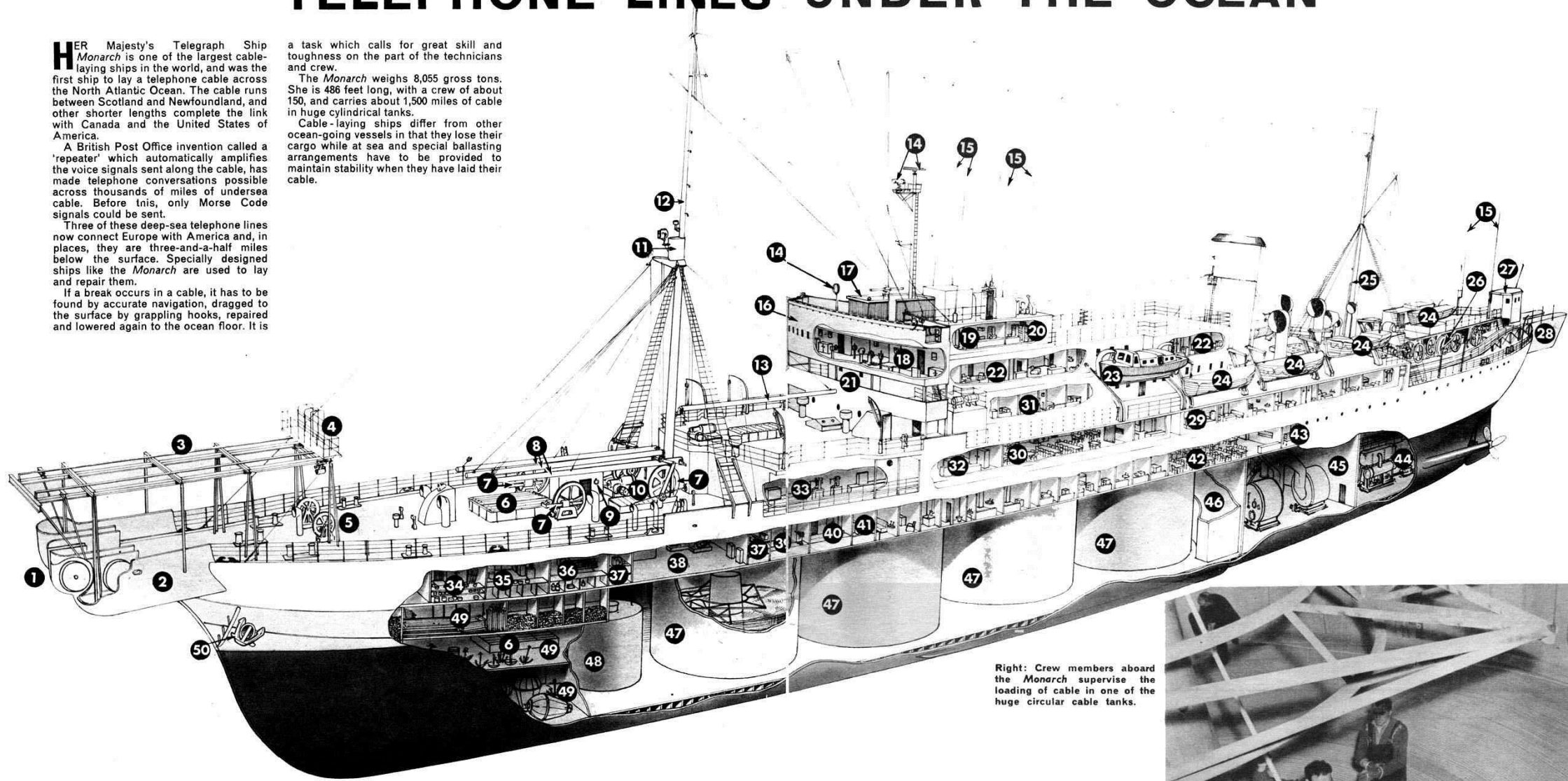
Three of these deep-sea telephone lines now connect Europe with America and, in places, they are three-and-a-half miles below the surface. Specially designed ships like the *Monarch* are used to lay and repair them.

If a break occurs in a cable, it has to be found by accurate navigation, dragged to the surface by grappling hooks, repaired and lowered again to the ocean floor. It is

a task which calls for great skill and toughness on the part of the technicians and crew.

The *Monarch* weighs 8,055 gross tons. She is 486 feet long, with a crew of about 150, and carries about 1,500 miles of cable in huge cylindrical tanks.

Cable-laying ships differ from other ocean-going vessels in that they lose their cargo while at sea and special ballasting arrangements have to be provided to maintain stability when they have laid their cable.



Right: Crew members aboard the *Monarch* supervise the loading of cable in one of the huge circular cable tanks.



1. Sheaves (grooved pulley-wheels).
2. Working platform.
3. Gantry for hoist.
4. Observation platform.
5. Guide pulley.
6. Cargo hatch.
7. Cable handling machinery.
8. Ten-ton steel derricks.
9. Drumroom.

10. Winch.
11. Crow's-nest.
12. Foremast.
13. 1½-ton derrick.
14. Navigational aids and communication equipment.
15. Whip aerials.
16. Navigating bridge.
17. Compass platform.
18. Wheelhouse.

19. Chartroom.
20. Radio room.
21. Captain's bridge.
22. Senior officers' quarters.
23. General service launch.
24. Lifeboats.
25. Mainmast.
26. 'V' sheave gear.
27. Control house.

28. Stern sheave.
29. Spare cabins for extra technical staff, etc.
30. Dining room for senior staff.
31. Officers' and senior technicians' quarters.
32. Cable test room.
33. Cable jointing area.
34. Joiners' stores.
35. Paint room.

36. Lamp room.
37. Battery room.
38. Electric cable machinery.
39. Joiners' shop.
40. Carpenters' shop.
41. Crew and technical staff cabins.
42. Crew's mess.
43. Servery leading from galley which is amidships.

44. Engine room.
45. Boiler room.
46. Fuel tanks.
47. Main cable tanks.
48. Spare cable tank.
49. Technical stores.
50. Anchor guard to prevent bow-lifted cable fouling stowed anchor.

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WHERE THEY
BLOW UP TRAINS
ON PURPOSE

See pages 8 and 9



JUNE · 18 · 1966

RAILWAY DAYS AND WAYS

Edited by TV personality and railway enthusiast, DAVID NIXON

WHERE THEY BLOW UP TRAINS ON PURPOSE

BRITISH RAIL'S HOLIDAY LINE

BRITISH RAILWAYS' only narrow gauge line, the Vale of Rheidol railway is famous for its breathtaking scenery. The twelve miles of its 1 ft. 11½ ins. track run from Aberystwyth to Devil's Bridge and as you might have guessed by now, it is in Wales.

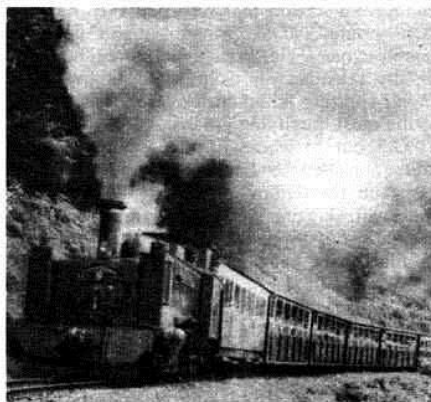
It is a single line track, and for most of the journey climbs perilously along a rock shelf cut in the mountainside high above the Rheidol Valley. The locos cannot turn round as there is no turntable and they have to make the return journey bunker first.

The line was opened in 1902, later becoming part of the Cambrian Railway until 1923 when that company was taken over by the Great Western. Today there are only three steam engines working on the line—small but powerful 2-6-2Ts.

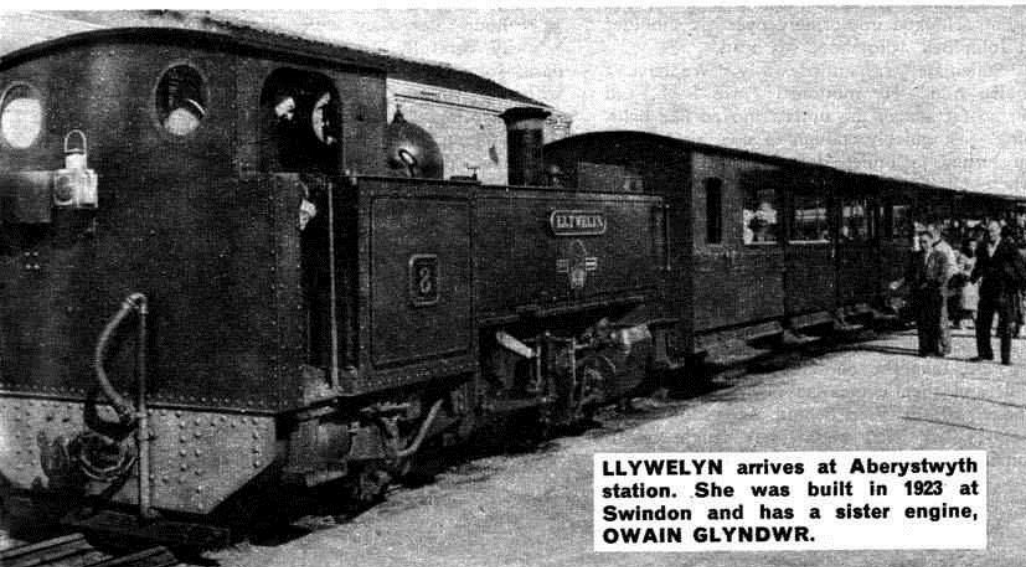
If you are ever lucky enough to visit this quaint old railway, watch out for No. 9 PRINCE OF WALES—it is the oldest and dates from 1902. The engines are painted in Great Western green and with their brass fittings brightly polished make a magnificent picture, so don't forget your camera.

The Vale of Rheidol Railway was originally built to carry slate from local quarries. Slate producing was an important industry in those days.

A few years ago it seemed the line might be closed, but because of its great popularity its survival is now assured. It is now mainly a tourist attraction and only runs at Easter and during the summer.

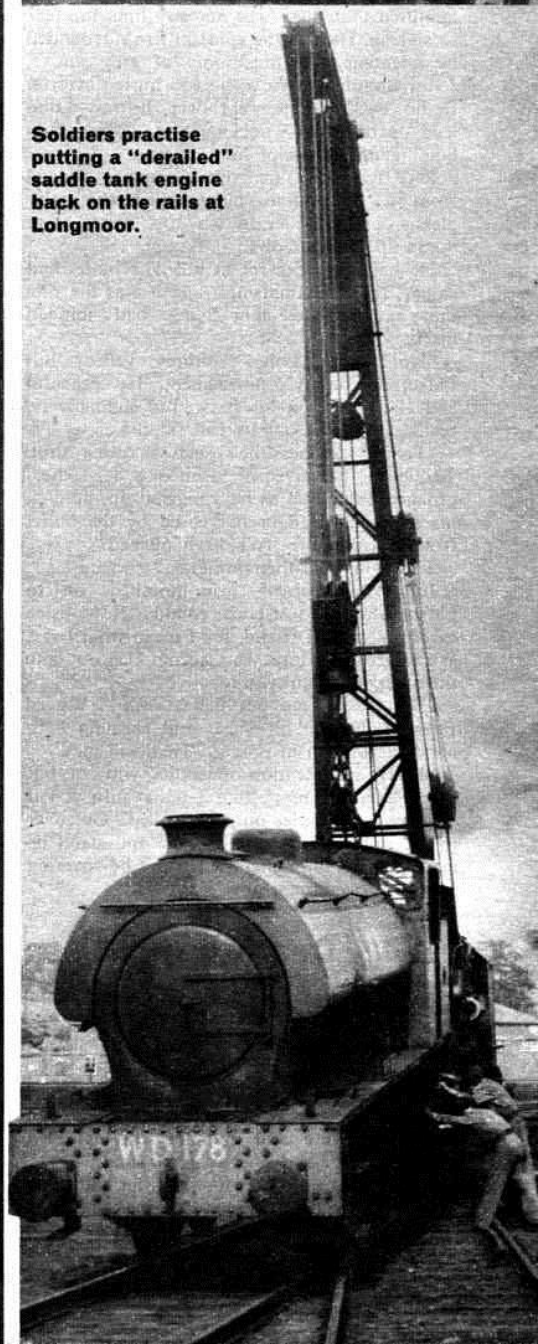


LLYWELYN travelling up the 700 ft. climb from Aberystwyth to Devil's Bridge.



LLYWELYN arrives at Aberystwyth station. She was built in 1923 at Swindon and has a sister engine, OWAIN GLYNDWR.

Soldiers practise putting a "derailed" saddle tank engine back on the rails at Longmoor.





Visitors to Longmoor on an "Open Day" clamber over "Kitchener", largest loco at the Army's School of Transport.

THE British Army has a reputation for being able to tackle any job that comes its way and quite apart from its role in battle, it trains men to carry out tasks which it sometimes has to take over from civilian organisations.

One of these is the running of railways in war time, or those sections of railways which may be in the combat area. Not only must its men be able to keep supply trains running, but when the need arises, they have also to blow them up to prevent them being used by the enemy as you can see from our front cover this week.

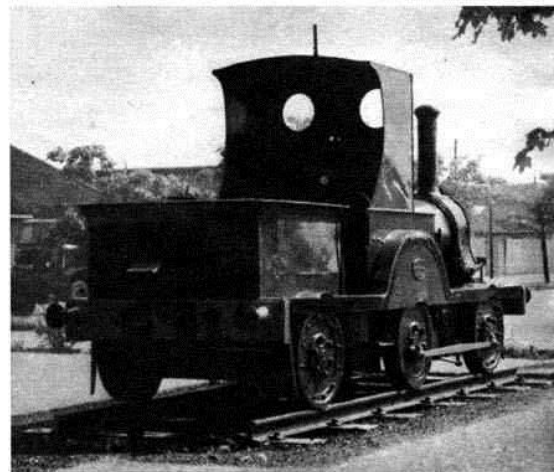
All the complex problems connected with railway working are taught at the military School of Transport at Longmoor, in Hampshire, which has been the H.Q. of the Longmoor Military Railway for over sixty years.

This is where the soldier learns how to run railways, repair them, build them—and destroy them!

The L.M.R. has sixteen miles of main line which runs from Martinique, just short of Bordon, to Longmoor where there is a connection with British Railways at Liss. This also contains a four-mile loop where training exercises are carried out. Drivers and firemen also undergo endurance tests on this stretch of line.

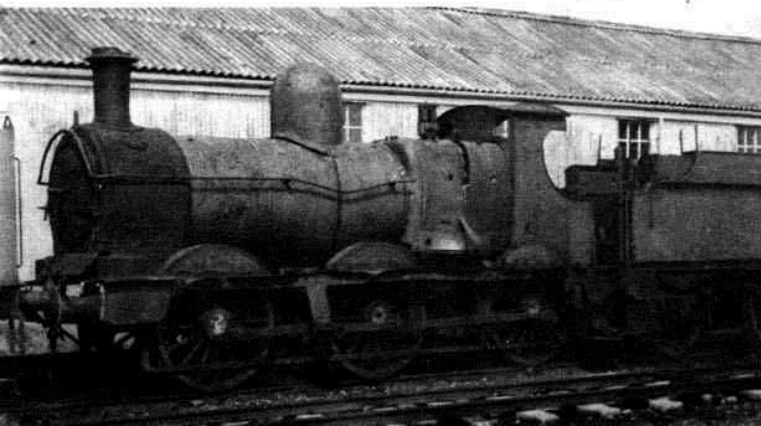
The Longmoor Military Railway has its own spotless stud of steam and diesel locomotives, many interesting items of rolling stock, repair shops and a school of signalling complete with model railway.

Apart from training, the L.M.R. also does a very useful job of work by shifting thousands of tons of Army stores.



This museum piece at Longmoor is a very old and unusual 0-4-2 called "Gazelle".

Many old engines have ended their days at Longmoor. Here is a G.W.R. veteran which suffered the "blowing up" treatment.



This is the Army's own station at Longmoor Downs. No charge is made for riding on the L.M.R., but you travel at your own risk.



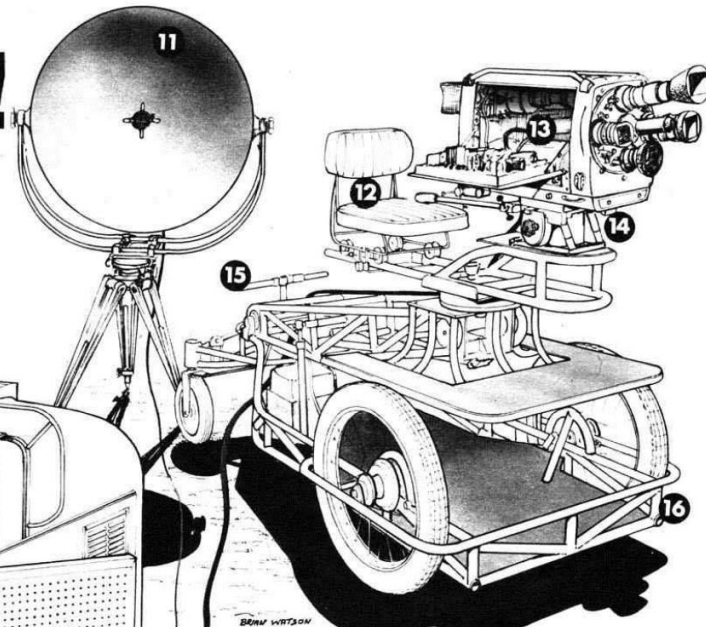
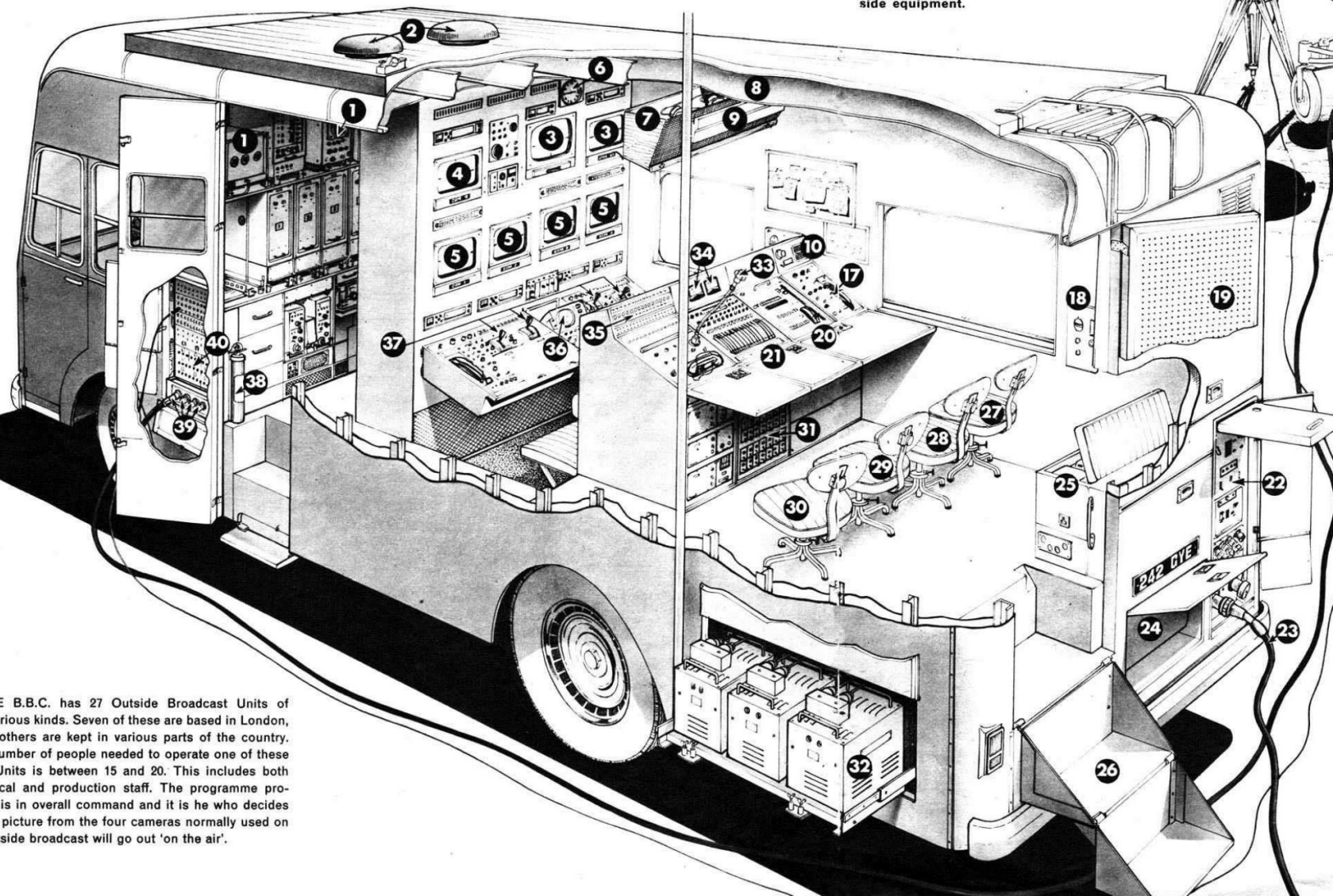
TELEVISION GETS MOBILE!

IN order to bring you live pictures of events which take place far from their studios, the B.B.C. use mobile television equipment known as Outside Broadcast Units. These units are

made up of a number of specialized vehicles such as aerial carriers, tenders for carrying the cameras, lighting equipment and electricity generators, but the vehicle round which the whole

operation is centred is the MCR or Mobile Control Room. Packed with electronic equipment, it is the nerve centre of the broadcast. Inside it sit the producer and his engineering and

production assistants, who between them control the sound and pictures which eventually reach the screen of your television set at home. Now take a look inside one of the B.B.C.'s latest MCRs together with some of its outside equipment.



Key:

1. Test equipment.
2. Ventilating fans.
3. Picture actually being transmitted.
4. Pre-view monitor screen.
5. Camera picture monitors.
6. Clock.
7. Loudspeakers.
8. Double skinned insulated van.
9. Interior light.
10. Microphone and talk-back control position.
11. Directional microphone with reflector for picking up distant sounds.
12. Cameraman's seat.
13. Picture pick-up tube.
14. Pan and tilt head.
15. Steering and raise/lower controls.
16. Camera 'dolly'.
17. One of three G.P.O. telephones.
18. Air-conditioning controls.
19. Sound insulated rear door.
20. Vision mixing panel operated by producer.
21. Sound control panel operated by sound engineer.
22. Power control board.
23. Power input cable.
24. Air-conditioning unit.
25. Spare camera tubes.
26. Foldaway steps.
27. Production assistant.
28. Producer.
29. Sound engineer.
30. Engineering manager.
31. Sound amplifying equipment.
32. Automatic voltage regulators.
33. Microphone for talk-back to commentators and cameramen.
34. Sound level meters.
35. Switchboard for sound lines and control circuits.
36. Test oscilloscope.
37. Picture quality control.
38. Fire extinguisher.
39. Cable inputs for four cameras.
40. Sound interconnections, in and out.

THE B.B.C. has 27 Outside Broadcast Units of various kinds. Seven of these are based in London, while others are kept in various parts of the country. The number of people needed to operate one of these O.B. Units is between 15 and 20. This includes both technical and production staff. The programme producer is in overall command and it is he who decides which picture from the four cameras normally used on an outside broadcast will go out 'on the air'.

RUSSIA'S GIANT HELICOP'



RUSSIAN aircraft designers have always been well-known for building some of the largest aircraft in the world, and when it comes to helicopters they are no slouches either!

In fact, the Mi-10 helicopter is the world's

largest rotorcraft and when it was displayed at the Paris Air Show last year it dwarfed almost everything else on the airfield.

The man who designed this giant 'flying crane' is called Mikhail Mil and

the first two letters of his name precede the type numbers of the machines he builds.

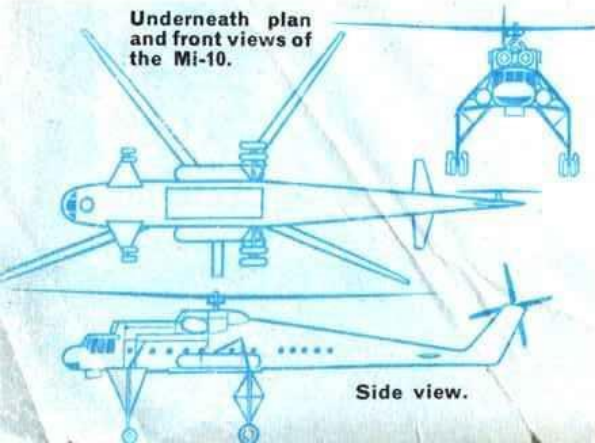
The Mi-10 arrived at the air show carrying a fully loaded, single-decker bus on the loading platform between its huge straddle legs. The five rotor blades have

a diameter of 114 ft. 10 ins. and are powered by two gas-turbine engines.

The machine can lift bulky loads of up to 14 tons, and the pilot is able to position the legs over the load by watching a closed circuit television screen.

The mechanical drawings of the Mi-10

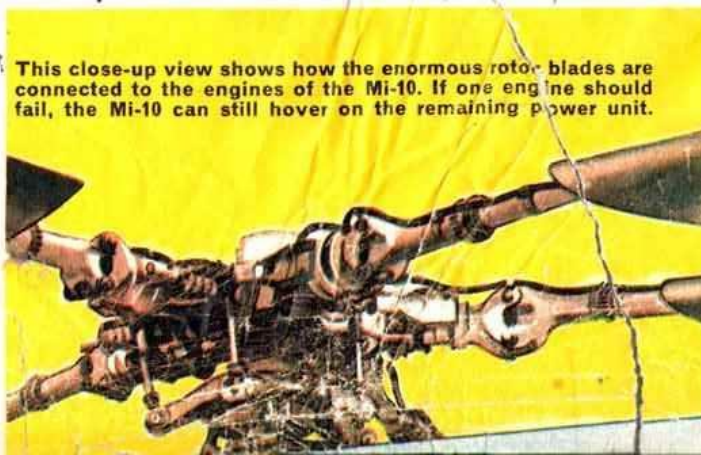
Underneath plan and front views of the Mi-10.



Side view.

The complicated hub which holds up the Mi-10 in flight.

This close-up view shows how the enormous rotor blades are connected to the engines of the Mi-10. If one engine should fail, the Mi-10 can still hover on the remaining power unit.



Another large Russian helicopter of similar design, the Mi-8.

The Mi-8 carries two pilots and 24 passengers.



RANGER

BOOK 1967



WRETH. (FROM MAMI & DADI - XMAS '66)

RANGER

BOOK 1967

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12/6



The old inn at
Santa Fe.

La Fonda—the inn at the trail's end

THE Santa Fe Trail. The words in themselves have a special magic of their own, evoking a not-so-distant past when men lived mainly by the gun in the lonely wilderness of the Wild West. There were many such trails, of course, in those days. But none of them attracted so many people from all walks of life, as this one that began in Independence, Missouri, and ended at

the little township of Santa Fe in New Mexico—a distance of 870 miles. Trappers and traders, soldiers and gamblers, cowmen and gunfighters, settlers and footloose cowboys, all of them travelled along this trail, which had already been marked out for them by the moccasined feet of the Indians.

They came because the “Mexican Trace”



Colourful inhabitants of Santa Fe.

as it was once called, led them into a country which was quite unlike any of the other historic highways across the West. At the end of such trails they were always greeted by shabby shacks and stores, which were inhabited by people who were very much like themselves. The Santa Fe Trail, on the other hand, led them into a strange land occupied by Mexicans who spoke Spanish, wore different clothes, and had their own customs. The climate, too, was always ideal, with endless days of sunshine and a bracing air that helped to make the hard trek almost enjoyable. And so they came, first in their hundreds, and then in their thousands, all of them heading for Santa Fe.

The trail was an old one even then. The first European to travel over part of it was a Spanish explorer named Francisco Vasquez de Coronado. This was as far back as 1541. More white men came, first the lone adventurers, mostly French trappers who were frequently attacked and killed by the Spaniards in New Mexico, and then the traders who were followed by the settlers.

The wagon trains, with their canvas covers billowing slightly in the cool breeze,

soon became a familiar sight along the trail. But beautiful as the country was, it could also be a death trap. Raiding Indians were always liable to be in the vicinity, waiting to pounce on some unwary straggler, or unguarded wagon train. Mindful of these dangers, the wagon trains elected themselves a Captain of the Caravan, whose knowledge of the trail fitted him for the task of guiding them all to safety with the minimum of risk. Kit Carson, the famous scout, led many wagon trains down this particular trail. Even today the ruts of their wagon wheels can be seen near the wayside, half hidden among the tumble weed.

For all those who travelled along this trail the ultimate goal was Santa Fe itself, where there was food and shelter at the Fonda (Spanish for inn.) Although the Santa Fe Trail was not officially opened until 1822, this inn had already stood there for several hundred years. More incredibly, it is still there today, rebuilt, but still in essence what it has always been—the Inn of Santa Fe at the trail's end.

La Fonda soon became a popular rendezvous. Here came the black-coated gamblers, whose nimble fingers flicked the

cards around the green baize tables by the light of the kerosene lamps; here the weary settlers paused, grateful for the chance to lie down to sleep without the fear of being scalped in the night; here the rich and the poor, the peaceful trader and the desperado rubbed shoulders at the bar, brought together by the common need for companionship after the rigours of the trail. Buffalo Bill and Kit Carson stayed here, and it is said that Billy the Kid washed dishes in the kitchen.

The book in which the guests signed their names was always filled with colourful signatures such as Pinkfaced Ned, Owl Creek Bob and Wild Bob of Nevada, who passed through Santa Fe with the countless others who were contributing their little best towards the building of the legend of the West.

In 1846, after the Texans had waged a war against the Mexicans for the right to claim that part of New Mexico East of the Rio Grande, the inn saw the arrival of a new type of guest in the shape of the army officers, who had taken part in the Conquest of New Mexico. The balls, dinners and social gatherings which they organised threatened to give the inn a new respectability that went ill with its colourful past. As its reputation continued to grow, Governors, Generals and other prominent people of the time began to be frequent guests at the



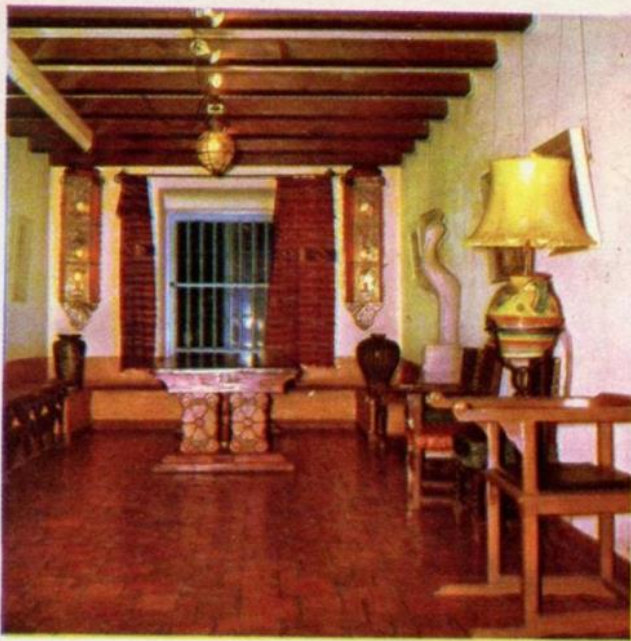
Indian beads for sale outside the La Fonda Hotel, Santa Fe.



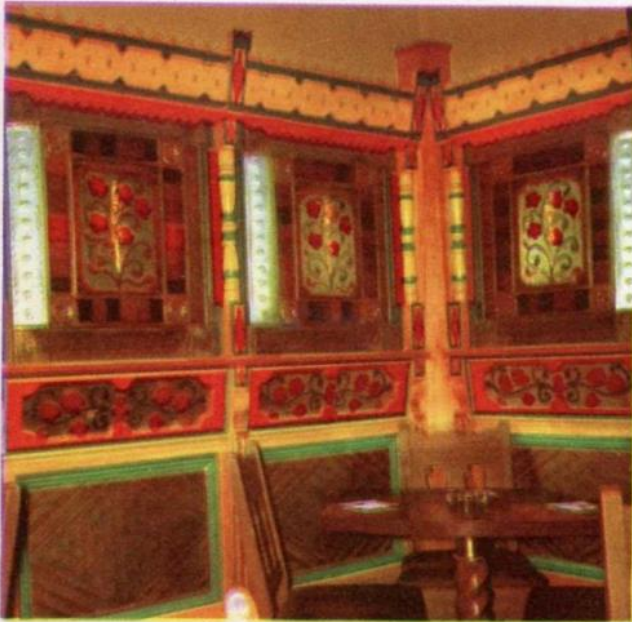
Hand made Indian pottery is for sale every market day in Santa Fe.

La Fonda Hotel as it is today.





A hallway in La Fonda Hotel.



Above, you can drink coffee in La Fonda Hotel.
Below, bask in the hot sun of New Mexico at La Fonda.



inn. Its simple, rough furniture was quickly replaced by other furniture, more suitable for its distinguished guests. Mocking birds in cages were placed above the portals, and a band was installed to entertain the guests.

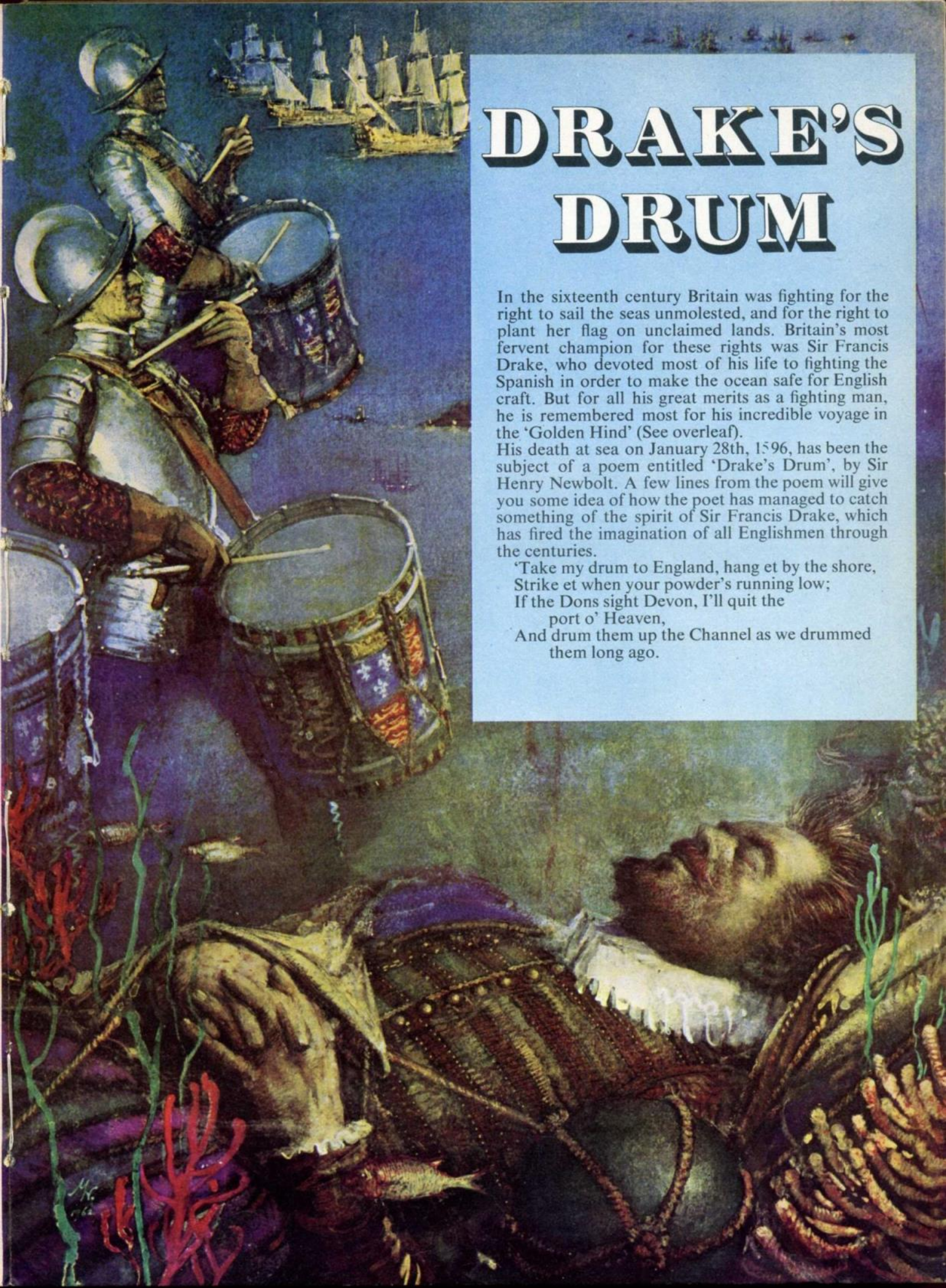
Although the passing of the years has now made Santa Fe respectable, it has still managed to retain a great deal of its old-time atmosphere and charm. The Governor's Palace is still there, and the Indians still come in once a week to sell their pottery and beads beneath the shade of its roof. As for the La Fonda—the Inn of Santa Fe—it is still there, looking something like the original inn. The hotel today is the property of the famous Fred Harvey organisation, which owns a number of hotels across the States.

Although it is a modern hotel with 203 guest rooms and suites, three dining rooms and a swimming pool, it has managed to maintain a good deal of the character of the original inn. It is this feeling that the hotel is still firmly rooted in its historic past, rather than its modern additions, which attracts so many tourists to it.



A picture map of New Mexico—an impressive mural in La Fonda.

In this modern age when world travel is within the reach of everyone, you too may one day travel down the Santa Fe Trail in order to reach the famous La Fonda Hotel. If you do, you will find it easy to see, in your mind's eye, those colourful travel-stained characters of yesteryear who clamoured at its door for food and a bed. Stay there and relive the days when the West was young.



DRAKE'S DRUM

In the sixteenth century Britain was fighting for the right to sail the seas unmolested, and for the right to plant her flag on unclaimed lands. Britain's most fervent champion for these rights was Sir Francis Drake, who devoted most of his life to fighting the Spanish in order to make the ocean safe for English craft. But for all his great merits as a fighting man, he is remembered most for his incredible voyage in the 'Golden Hind' (See overleaf).

His death at sea on January 28th, 1596, has been the subject of a poem entitled 'Drake's Drum', by Sir Henry Newbolt. A few lines from the poem will give you some idea of how the poet has managed to catch something of the spirit of Sir Francis Drake, which has fired the imagination of all Englishmen through the centuries.

'Take my drum to England, hang et by the shore,
Strike et when your powder's running low;
If the Dons sight Devon, I'll quit the
port o' Heaven,
And drum them up the Channel as we drummed
them long ago.

THE GOLDEN HIND

SIR FRANCIS DRAKE'S voyage around the world was one of the greatest feats of navigation that have ever been carried out. It was a greater feat than that of Magellan, for when Drake sailed away and passing the Straits of Magellan, went out into the wide Pacific, he was not only in unknown waters, so far as Englishmen were concerned, but in danger also of meeting at any time a superior force of Spanish vessels. When we think of the size of Drake's ship, 'Pelican,' afterwards re-named the Golden Hind, one can only marvel at the daring of the navigator and his men. When the ship came back from its voyage, a special dry dock was built for it at Depford, and it was preserved there for nearly a hundred years, as a tribute to a brave and gallant Englishman.



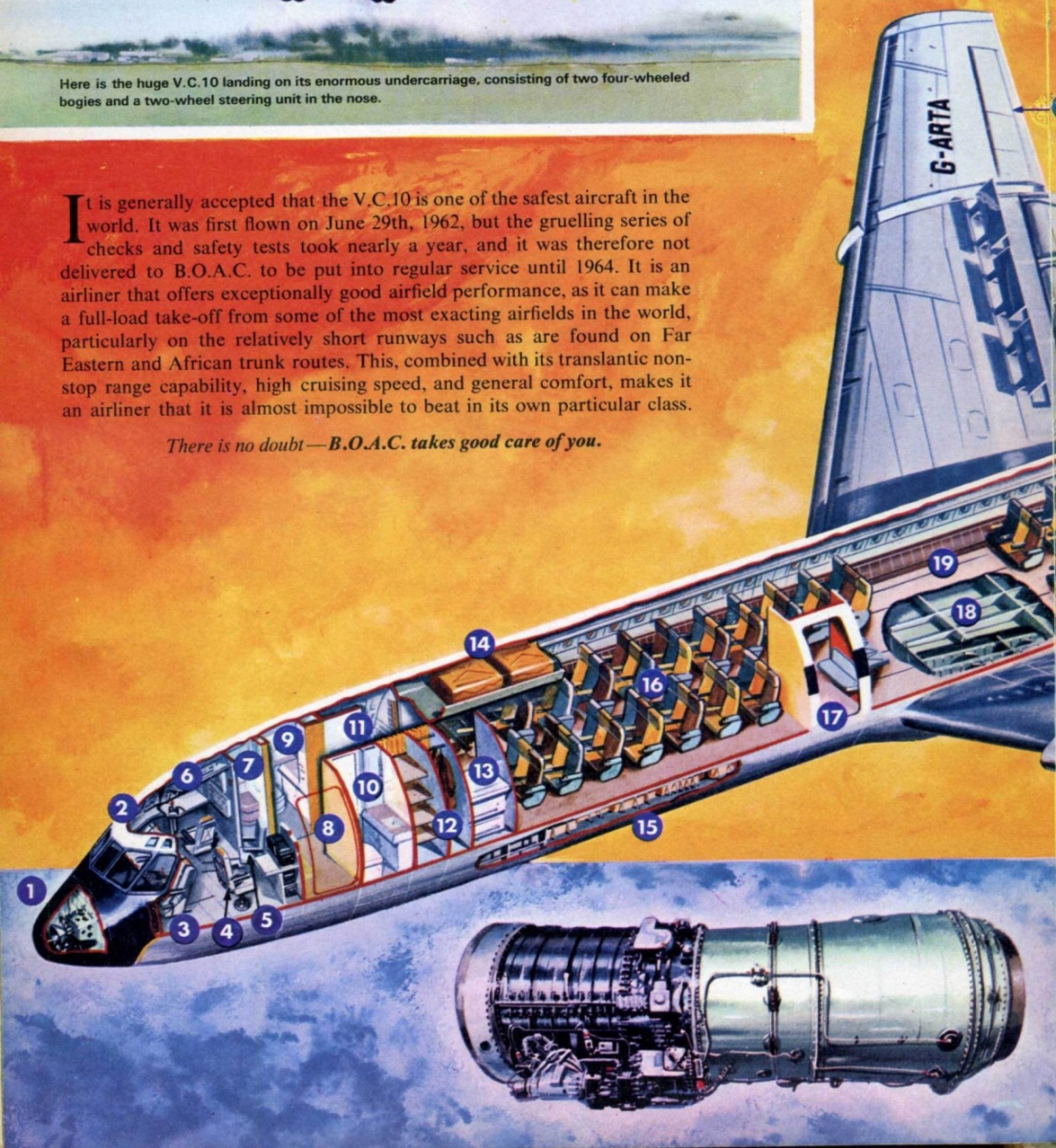
1. Figurehead—a Golden Hind.
2. Beak.
3. Spritmast.
4. Anchor.
5. Anchor Catheads.
6. Anchor windlass.
7. Foremast.
8. Galley with stove.
9. Chimney from galley.
10. Forecastle.
11. Longboat.
12. Deck grating in waist of ship.
13. Brass Cannon.
14. Main Mast.
15. Main Hold containing stores, water cables, etc.
16. Hatch through which the Bo'sun yelled orders to the helmsman.
17. Whipstaff. This is connected to the tiller and used by the helmsman to steer the ship.
18. Tiller.
19. Rudder.
20. Mizzen mast.
21. Quarter deck—the officers deck.
22. Poop. Where officers lived.
23. Captain's cabin.
24. Captain's gallery.
25. Stern lantern.



Here is the huge V.C.10 landing on its enormous undercarriage, consisting of two four-wheeled bogies and a two-wheel steering unit in the nose.

It is generally accepted that the V.C.10 is one of the safest aircraft in the world. It was first flown on June 29th, 1962, but the gruelling series of checks and safety tests took nearly a year, and it was therefore not delivered to B.O.A.C. to be put into regular service until 1964. It is an airliner that offers exceptionally good airfield performance, as it can make a full-load take-off from some of the most exacting airfields in the world, particularly on the relatively short runways such as are found on Far Eastern and African trunk routes. This, combined with its transatlantic non-stop range capability, high cruising speed, and general comfort, makes it an airliner that it is almost impossible to beat in its own particular class.

There is no doubt—B.O.A.C. takes good care of you.



VC10

BRITAIN'S WONDER AIRCRAFT

1. Weather Radar equipment.
2. Co. pilot's seat.
3. Captain's seat.
4. Navigator's seat.
5. Seat for extra crew member when one is carried.
6. Flight Engineer's seat.
7. Crews toilet.
8. Forward passenger door.
9. Passengers toilets.
10. Passengers toilets.
11. Forward galley.
12. Forward cupboard and wardrobe.
13. Bar.
14. Water storage tanks.
15. Cargo storage below passenger cabin.
16. Passenger cabin. This can be partitioned to make two cabins if necessary, one forward and one aft.
17. Centre Passenger door.
18. Landing wheels fold and stow below floor.
19. Special floor fitting to allow seats to be taken out easily and quickly.
20. Flaps.
21. Aileron in two parts, inner and outer.
22. Rear Water Storage tanks.
23. Rear Galley.
24. Rear Cupboard and Wardrobe.
25. Toilets.
26. Rudder divided into three parts, top, middle and bottom.
27. Tail plane angle control mechanism.
28. Elevator also divided into two parts, inner and outer.
29. Thrust reversers.
30. Rolls Royce Conway 42 turbo jet.
31. 'Spoilers' or airbrakes.
32. Slats.

The captain always sits on the left hand side of the aircraft, when flying the airliner. The crew usually consists of Captain, co-pilot and Flight Engineer. Navigators and extra crew members are only carried on special flights.

The Rolls-Royce Conway 42 engine in the V.C.10 is remarkable for its fuel economy and quietness. Although it has no suppressors, its noise level is no higher than other civil jets which do have suppressors.

The Battle of the Bulge

It was the winter of 1944. Six months has passed since the D-Day invasion of Europe—six long months of hard fighting by British and American troops during which they had forced the formidable German Army back across France and the Low Countries. The end of World War II seemed to be in sight at last, and in spite of the bitterly cold weather, the Allied armies were in good heart as they gathered their strength for the final attack on the evil Nazis.

In the north stood the veteran British Eighth Army under General Montgomery; in the south was the American Third Army commanded by General Patton, while along an 88-mile stretch of the front in the centre were a few battle-weary American divisions

resting in what—for the moment—was a quiet sector. Although these men knew they had no chance of being home for Christmas, they felt that for them the war was over.

They could not have been more wrong!

For weeks the Germans had been secretly preparing a massive offensive. Seventy divisions, fifteen of them armoured, had been assembled and a plan, master-minded by Adolf Hitler himself, had been prepared.

Intelligence reports coming into Supreme Commander General Eisenhower's headquarters, made him suspect something was afoot, but bad flying weather had made photo-reconnaissance difficult.



German Tiger tanks are stopped by deadly accurate shell fire. A scene from Warner Bros film, 'Battle of the Bulge.'



The Belgian town of Ambleve is attacked at Christmas in Warner Brothers Cinerama film, *Battle of the Bulge*.



German tanks break through the Ardennes Forest. Another scene from the film, *Battle of the Bulge*.

Low clouds and frequent snow blizzards prevented the pilots from taking the pictures which would have revealed the Germans' feverish preparations.

On December 16th. the Germans struck. A tremendous artillery barrage preceded a violent onslaught by giant King Tiger tanks of the Sixth Panzer Army. Caught unprepared, the Americans fell back.

Within a matter of hours, three new spearheads of armour had pierced the allied frontline and as the urgent messages flashed to the various divisional headquarters, it was obvious a major offensive was under way. The Battle of the Bulge, or more correctly, the Battle of the Ardennes, had begun.

Although the timing and weight of the attack took the Allied High Command by surprise, General Eisenhower and his staff quickly realised what the Germans were trying to do. Using their tough Panzer Divisions as a battering ram, they hoped to punch a hole in the front and strike out for Antwerp.

If they succeeded the American and British Armies would be split in two and the only fully operational seaport supplying them along the Channel coast would be captured.

Swiftly, General Eisenhower issued his orders giving General Montgomery command of all British and American forces in the North while General Omar Bradley was given the task of counter-attacking the enemy from the south with the American Third Army.

For several days the battle swayed to and fro, but although they were badly battered and outnumbered, the Americans hung on grimly.

Before the end of December the Germans' attack slowed down, but they made one last desperate effort. On January 1st. they made violent low-level attacks on all the allied airfields in the battle area, but it was the final fling of a defeated enemy. The might of the American and British armies began to roll the enemy back and within a month the Germans had nothing to show for their effort except their casualties which added up to 120,000 men.

Warner Bros have now made a super Cinerama film in Technicolor, 'Battle of the Bulge,' which is a gripping and exciting celluloid reconstruction of this tremendous battle, which was the last German offensive of World War II.



American troops move forward to take up defensive positions. A scene from the film, *Battle of the Bulge*.



ROLAND DAVIES

The Battle of Britain did much to restore our national pride, which had received a severe blow after the retreat of the British

forces from Dunkirk. For five months, a handful of young pilots, went up day after day to claw the Luftwaffe planes from the skies.

THE BATTLE OF BRITAIN



On September 14th, 1940, the battle for the skies over Britain, reached its climax in a series of desperate aerial battles in which

the Luftwaffe suffered an overwhelming defeat from which it never really recovered. Air supremacy over Britain was now ours!

ROCK PILOT



"Stand by for contact," he said hoarsely. "We can't get through without hitting something—". Even as he spoke the great ship shuddered . . .

"Meteor swarm coming in from two o'clock low!" the voice blared in his earphones. Brian twisted wildly at the wheel of the computer-finder, until it pointed at the onrushing rocks. The computer clicked as it measured direction and speed of the hazard, then gave him a course that would take his space ship around them. But, even before the numbers had appeared on the screen before him, he had twisted the control grip to fire the side jets. When the course did appear, a fraction of an instant later, he had only a slight correction to make.

There was no rest. As soon as he had avoided the hurtling boulders a new menace appeared on the forward screen—an asteroid at least a mile in diameter. It turned slowly as it swam towards his ship, jagged stone, its surface scored and marked by countless collisions with the stone and iron rubble of the asteroid belt. Brian slammed on full keel jets to rise over the monster—only to discover that it had concealed a mass of smaller asteroids. The computer hummed and clicked out a change of course to avoid these too, while Brian twisted the control grip.

The course changes were coming faster and faster now as the rocket penetrated to the heart of the asteroid belt, and more and more rushing masses of stone and iron filled space in all directions. Like a darting minnow the rocket twisted through them, missing destruction only by fractions of a second.

The end came suddenly. There was no way to avoid the pitted mountain of granite that appeared suddenly on the screen. He threw on full braking jets, but it wasn't enough. The flames from the jets lanced out before the ship, lighting up the rock with an infernal glow as it grew larger and larger, filling the screen, every detail clear, right on top . . .

There was a burst of flame, then darkness, as it hit. Brian drew back in spite of himself, raising his arm before his face. He smiled, embarrassed, as the door opened next to him and the instructor poked his head in: Brian quickly dropped his arm.

"Climb out," the instructor barked, "this trainer isn't private property. There are others waiting."

It was a realistic trainer, sure enough, Brian thought to himself as he pushed through the open door and drifted down to the deck outside. Another cadet climbed into the dark bulk of the trainer and the instructor slammed the door behind him. Brian looked on as the instructor threw the switches that set the trainer into operation. Now the other cadet was in there, flying a make-believe voyage through the asteroid belt, a voyage that seemed so real that after a while you forgot it was only a training device with a film projector and a screen. *You flew that ship.*

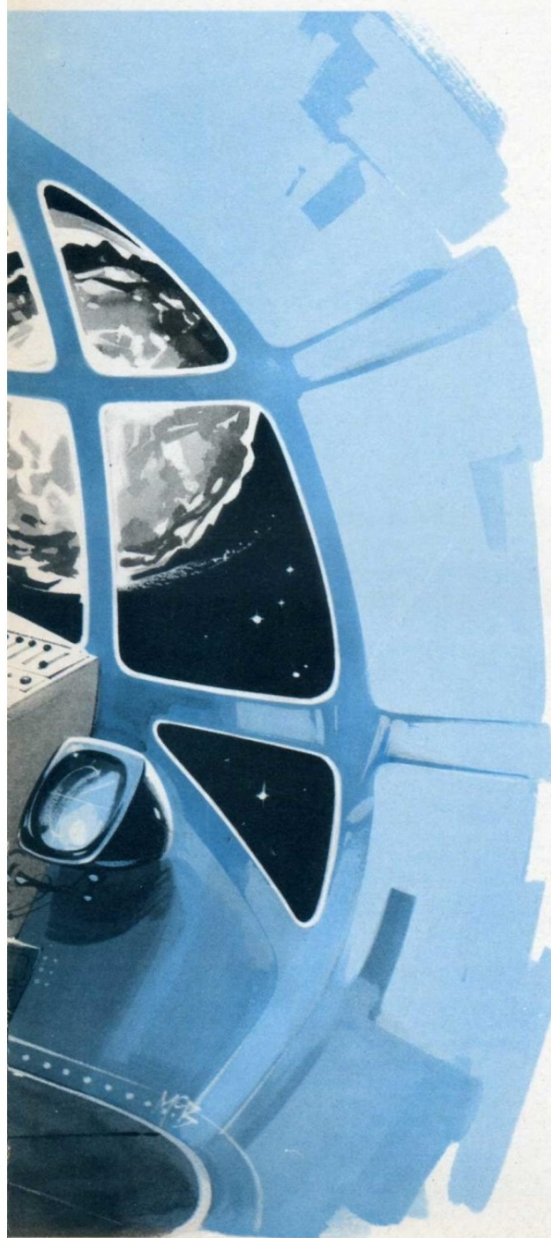
The instructor was an old spacer with grey stubble showing on his shaven skull and the deep marks, almost scars, above his ears where his space helmet had rested for endless hours. He turned from the controls and scowled when he saw Brian still standing there.

"I wanted to ask you something, sir—"

"About how you did in the trainer? They all want to know that."

The instructor's stone face slowly cracked into a smile.

"If you must know," he said, "I had the test up to three



times the normal speed—and I held it there for five minutes before you crashed. You were doing something I had never seen before, mister, and I wanted to see if you could go on doing it. You were making course adjustments *before* the computer fed them to you, did you know that?"

"Yes, sir, it's well—sort of a knack."

"It would be a handy knack to have if your computer ever packed up. But as long as you have a computer—*use* it! Understood!"

"Understood, sir," Brian said, then got out of the compartment as soon as the instructor turned back to his work. He had taken a chance, talking up like that, but he had had to know. The big test, the *real* test was coming soon, and he couldn't flunk it. He went back to the observation room and looked out through the transparent steel wall at the myriad sharp gleams of the stars against the ebon blackness of space.

They would be arriving at Asteroid Central soon. Space school was behind him, five long years, and the three month trip from Earth out here to the asteroid belt was almost done. The time had not been wasted since the big spacer had a number of training devices aboard and they had been in use right around the clock. He was ready—they all were ready—to take their places among the ranks of the rock pilots, the men who mined the asteroid belt for the boulders of iron. Brian squinted out at the darkness, but knew before he looked that he could not see the asteroid belt, though it was certainly there.

This was man's biggest venture in space. As the age of technology used up the metal on Earth other sources had to be found. The answer was out in space, between the orbits of the planets Mars and Jupiter. Ages ago another planet had existed here, but had been destroyed in some titanic explosion. Though the planet was gone, the parts of it still existed, wheeling in slow orbit about the sun. Some of the asteroids were mere pebbles, while others like Ceres and Eros measured hundreds of miles through. Metal, solid metal from the dead planet's core, was here for the taking. Men came to take it.

Giant steel furnaces were set up, plastic mirrors just a few thousandths of an inch thick but miles wide, that reflected the sun's heat and condensed it in a furnace that was hotter than the hottest blast furnace on Earth. Iron was smelted in these space-going, solar furnaces, and the pilots of the rock chasers went out among the floating, grinding mountains and dragged back the iron asteroids that were the raw material. It was a hard job and a dangerous job, but it was the only job in the solar system that Brian Collins had ever wanted. And soon...

The ship shuddered and all the lights went out. Under Brian's feet the floor tilted and twisted—he grabbed for the rail beneath the observation window. Through his fingers he felt the vibration of distant shocks, something tearing at the fabric of the ship, then silence. He was alone in the darkness, fighting down panic.

The Rogue Meteorite.

First there was a flicker, then a wan, blue light came on as the emergency circuit went into operation. There was a rasping of static and a voice spoke from the loudspeaker on the wall.

"This is the first mate speaking. Everyone forward of bulkhead 16 to the control room at once. Those aft of this bulkhead to engine room. Leave now."

Brian pushed away from the wall, floating in the neg-gravity, and with a tug on the bar launched himself towards the doorway. As he made his way towards the control room the first mate's voice followed him, from the speakers placed every ten yards.

"The ship has been holed by a rogue meteorite, moving too fast to be detected. We are losing air amidships and will seal off this section as soon as everyone is clear. This is one minute at the longest. *Move*—your life depends on it!"

Brian made it to the control room with just nine seconds to spare. The air-tight door was closed almost at his heels.

He worked his way forward to the control positions and saw, with a shock, that no one was piloting the ship. The seats were empty and the officers were grouped to one side listening to the first mate. Brian moved close enough to hear what was being said.

"... so that is the situation, gentlemen. If you want a single word to describe it, I would say desperate. The captain is dead, he was in the instrument section when the meteorite hit. All our computers are gone, as are most of our control and navigation instruments. We have radioed to Asteroid Central, but it will be five hours at least before ships can reach us. By that time we will all be dead."

"I don't understand," someone said, "why should this happen? Can't we just cut the power and drift until help arrives?"

The Asteroid Belt.

"That is impossible," the first mate said. "We are at the very edge of the asteroid belt, moving towards it at top speed. We could not brake in time. We shall reach it in..." he looked at his wrist watch, "... exactly seven minutes. We can steer the ship by hand—but we cannot plot a course through the belt without the aid of the computers."

As he heard these words Brian's heart thudded loudly in his chest. As though the first mate were talking directly to him. No, it was impossible. A spacer could not be taken through the asteroid belt without a computer. The first mate had said that and he should know. It was one thing to take a guess at the right course when you had the electronic brain to back you up. It would be another thing altogether to pilot the ship without aid of any kind, with the lives of a hundred men depending on your skill—or guesswork! No, it couldn't be done.

At that moment Brian realized that someone was looking at him. The attention of everyone seemed to be fixed on the first mate, but of all the officers there, one was staring at Brian. Dark, hard eyes fixed on Brian, never moving. Waiting. It was the trainer instructor. Without taking his eyes from Brian he spoke.

"I have a suggestion." The officers turned towards him. "There is one man aboard this ship who can fly it without computer aid. If he will volunteer, I think he can do it."

There was a mumble of dissenting voices and comments that Brian was only vaguely aware of. The instructor was still looking at him and he felt his feet moving forward of their own accord. When he spoke it was as though someone else was speaking.

"I'll try to take the ship through," he said.

"You!" an officer said, "You're just a cadet. You've flown nothing bigger than a training ship around the moon."

"Impossible, not without a computer," said another.

"I've seen him do it." The instructor's voice cut like a whiplash through the hum of voices, silencing them instantly. "He's first in his class, so he should be a good enough pilot. But that is not the important thing. I've seen him at work in the trainer and he has been able to change the direction of the ship before getting the computer directions. And he has done it *correctly*."

"But how? How does he do it?"

"That is not important now. The question is—can he do it with this spacer. With his own life and all of ours at stake. Will you permit it, sir?" he asked the first mate.

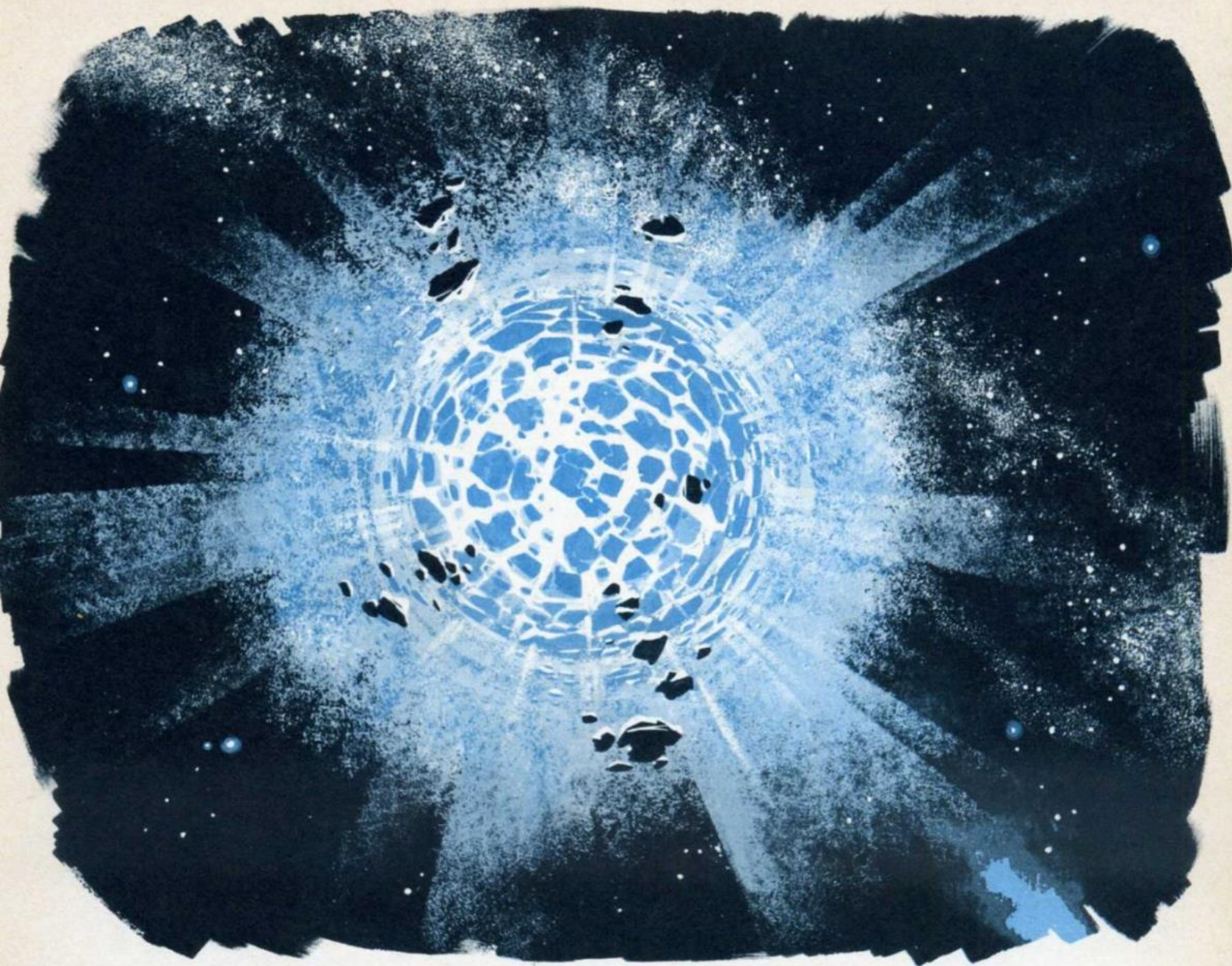
"If he can do it—the pilot seat is his," the mate said without hesitation. "But *can* you do it?" he asked, turning to Brian.

Brian held his thoughts in a tight grip—he dare not think of what would happen if he failed. He must try.

"I can do it, if you'll give me a chance."

The first mate silenced the babble of talk with a wave of his hand. "Into the seat." He ordered. "Third officer, call through to the engineer and tell him to stand by for full power. Power to the controls now. This ship is going through."

The control panel winked red, green and white as it came to life and the safety belt automatically tightened about Brian's waist.



"The shortest course through the belt is P-109-3," the first mate said.

"Stand by for course change," Brian said and twisted the controls.

Behind him there was only silence as the first chunks of rock appeared and Brian gave a quick kick on the jets that moved them clear. The radar bleeped as it detected more and more objects ahead, and asteroid after asteroid swam into view on the screen.

Two, three chunks of iron or stone he could easily avoid, steering clear of them all, but conditions were getting worse. First five, then six different objects came into view in space ahead and he pushed on the forward jets and looked for a way through. It seemed to be hopeless. There was nothing—

"Stand by for contact," he said hoarsely. "We can't get through without hitting something—so I'm going to make it the smallest chunk out there. I'll try and take the rock midships, it can't do much more damage there."

Even as he spoke the great ship shuddered—and the lights dimmed. Brian tried not to notice them, biting so hard on his lip that it brought a trickle of blood. If the power failed now they were all dead. Then the lights flared up as another circuit was cut in.

The lights flared up and went out. Someone shouted.

"It's all right," Brian said, and was surprised at how hoarse his voice was. "We're through. We can drift now until the relief ship gets here." His hands shook as he un-

strapped the belt and left the chair. The first mate was there, his hand out to take Brian's.

"You have my thanks, mister—all our thanks. You did it. Maybe now you can tell us how you do it."

"Just a knack, sir," Brian said, turning away.

"But you must know *how* you do it? What is the secret?"

"No secret, sir. It's just that, well—I was captain of the school Rugby team. I have always enjoyed rugger, played all the time, and one day I got to thinking. You won't laugh, sir?"

"No one in this ship is going to laugh at you, mister," the first mate said grimly.

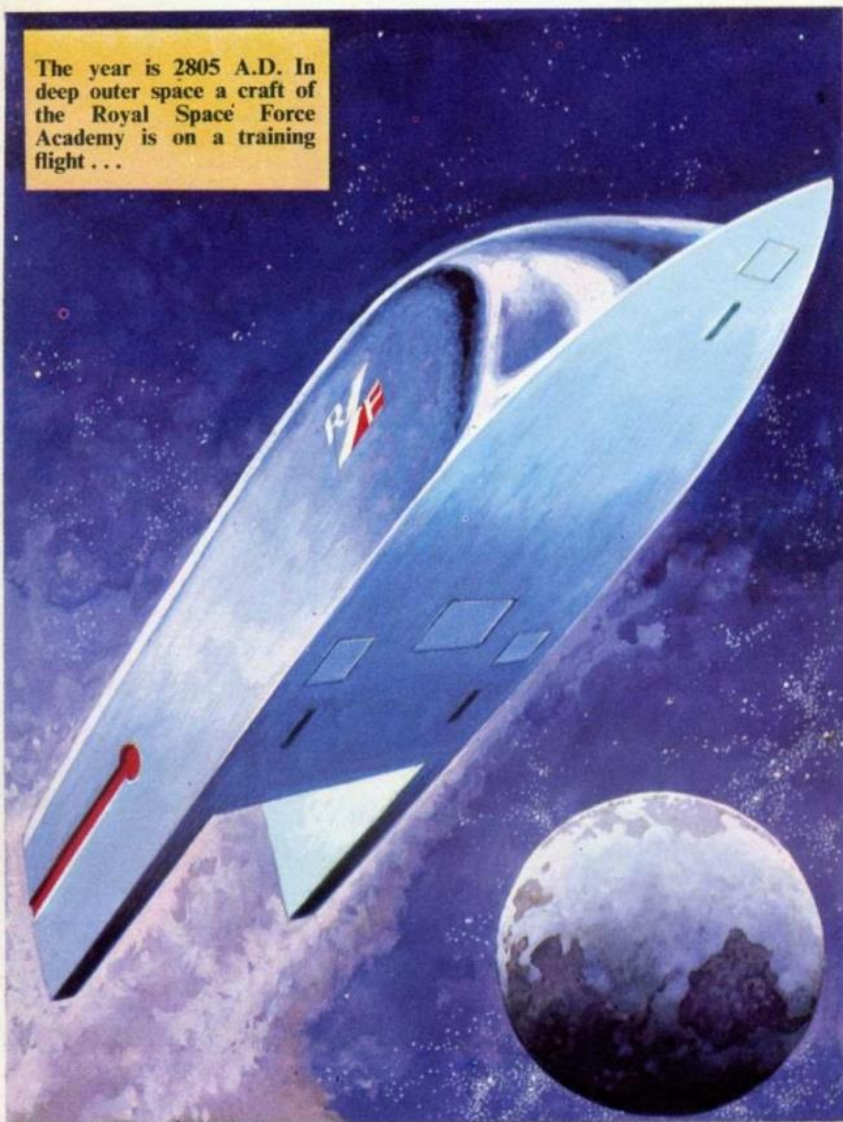
"Well, doing broken field running, avoiding tacklers, catching the ball while you're moving—it's a lot like piloting a ship through the belt. All the bodies are in motion in three dimensions and you have to get through them without being stopped. I thought that if I could do it with people—it might work in a spacer. I tried it in a trainer and found, that with practice, I could do it all right. It helped me to concentrate on the course, made my piloting better. I hope you won't be angry, sir?"

"Angry?" the first mate said, then laughed. "Mister, the first thing I'm going to do when we get to Asteroid Central is to recommend you for a decoration. The second thing will be to write to the school and tell them that *everyone* goes out for rugby now. It's going to be a required course!"

THE END

SPACE CADET

The year is 2805 A.D. In deep outer space a craft of the Royal Space Force Academy is on a training flight...



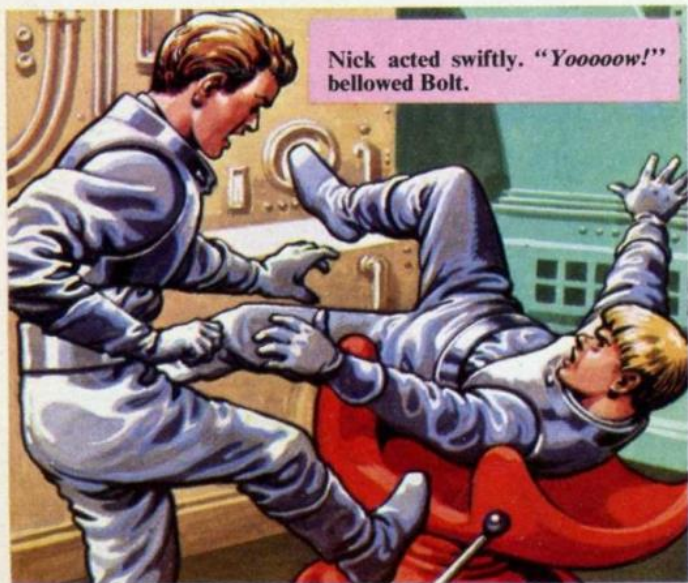
Commanding the craft was cadet Jason January. His best friend Nick Ringgold was at the controls. "We'll turn back to earth in six hours' time, Nick," said Jason.



Then Jason went aft to the engine room, where Tom Bolt was keeping watch on the giant atomic engines. Or at least he was *supposed* to be keeping watch.



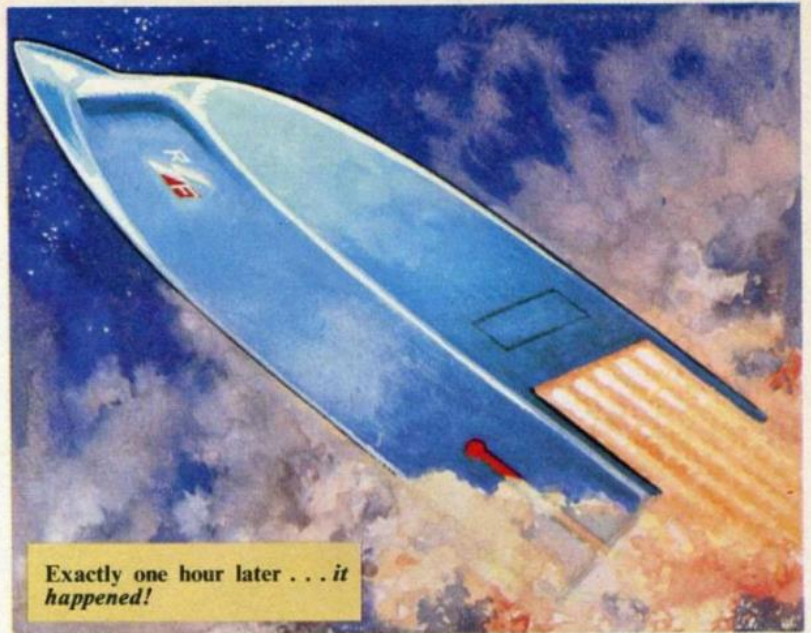
Nick acted swiftly. "Yooooow!" bellowed Bolt.



Jason pointed to the control panel. "The engines are overheating badly, Bolt," he snapped. "Your neglect could land us all in a mess."

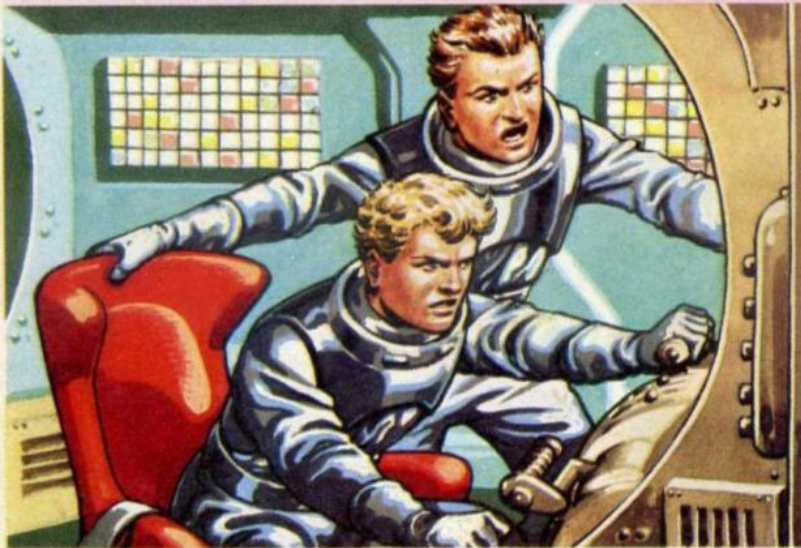


Jason left, with a stern warning, but the bully of the Ranger class settled himself down to sleep again. "I don't need that big-head to teach me *my* job," he growled.

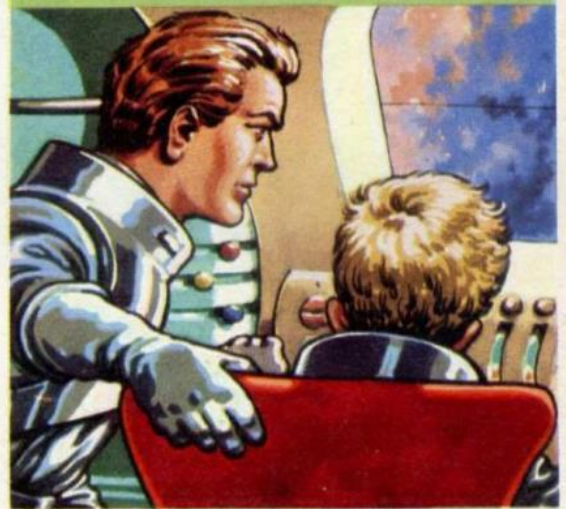


Exactly one hour later . . . *it happened!*

Jason January rushed to the controls. "The starboard engine's overheated and blown up," he gritted. "That ass Bolt is to blame!"



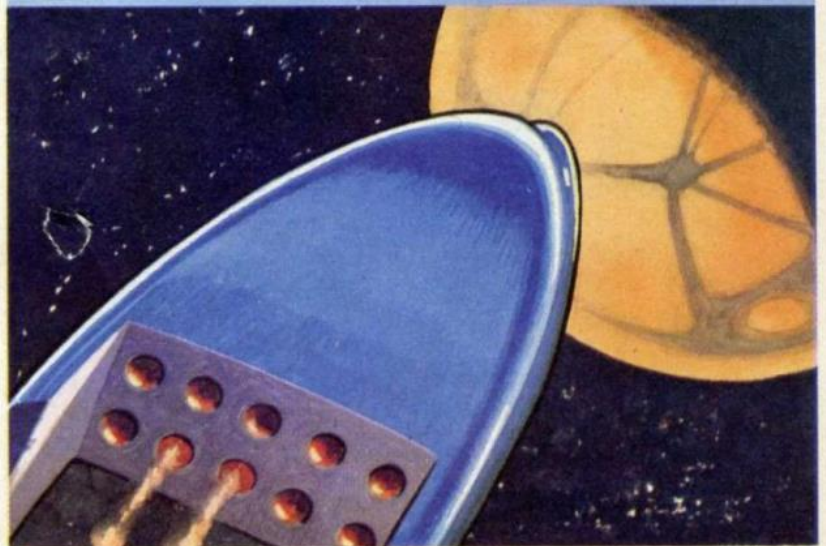
"What's to be done?" asked Nick. "We'll never make it back to earth," replied his chum. "We must land on the nearest planet and repair the engine."



"But the nearest planet is Mars!" exclaimed Nick in dismay. "Then Mars it will have to be," replied Jason grimly.

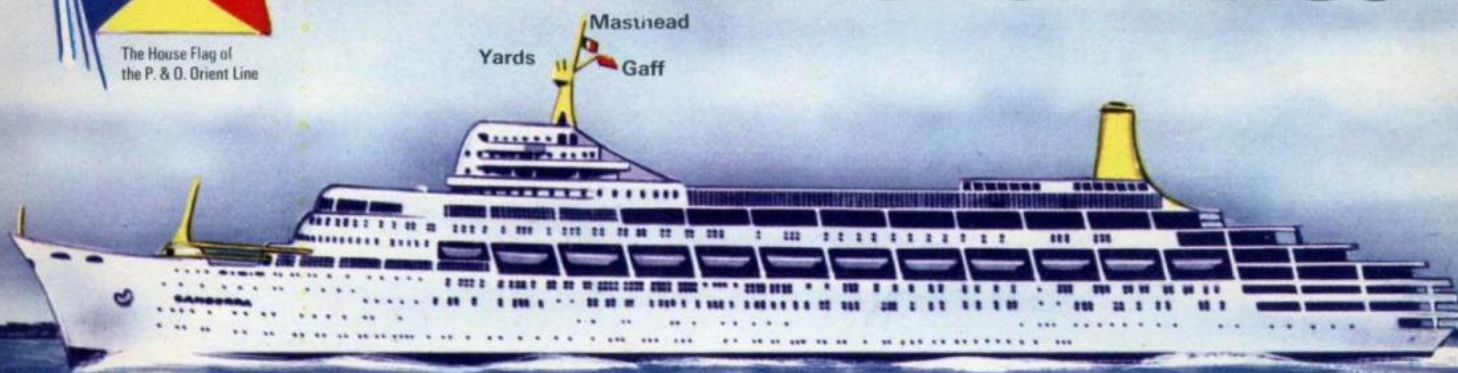


Mars! In the 20th century it had been a planet of mystery. In the 29th it was inhabited by the descendants of settlers from Earth . . .

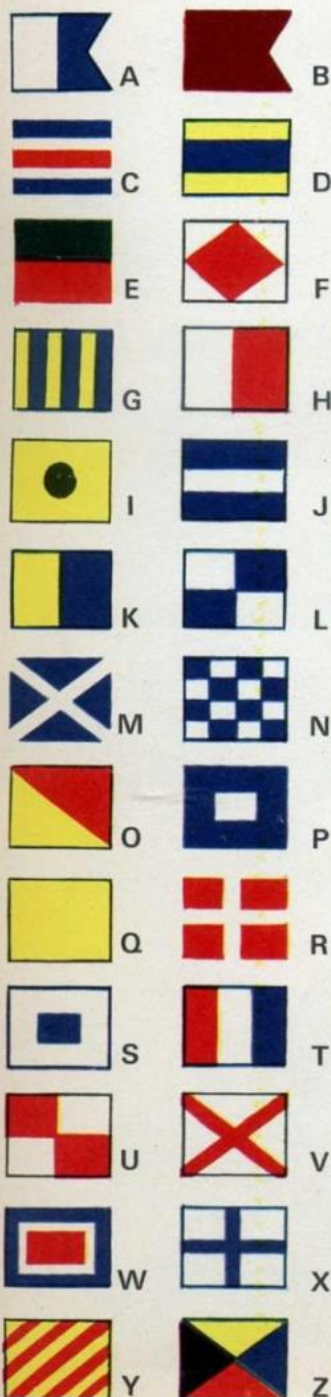




THE LANGUAGE OF FLAGS



Code flag and answering pennant.



The language of flags has built up over a long time. In the early days when ships were a mass of masts and spars, the first or foremast was the most important position, then the main, and finally the mizzen. Today, many ships like the Canberra (see above) have only one which has to do the job of all masts.

Most of the flags today are part of an international code, which is composed mainly of short hand signals. Thus 'YJ' means water in any language, so that a Chinaman will understand the message, even if it is hoisted by a Spanish sailor on a British ship.

NAVAL COURTESY

On entering a foreign port a ship always hoists the courtesy flag. This is the merchant marine ensign of the country it is visiting, and it is hoisted to the major position, known as the foremast. This courtesy has become an unwritten law and failure to carry it out can lead to unpleasantness in some countries. The ship *must* carry its national ensign, and it will also carry its signal number, which is a four letter code. Each ship has its own signal number, which is also its individual radio call sign. There is a nautical book published, 'The Book of Signal Letters of British Ships', which lists all these signs.

THE BLUE PETER

When approaching port, the ship will fly 'Q' if it has a clean bill of health, or 'L' if it has not. It will hoist 'G' if it needs a pilot, which is replaced by the pilot's flag as soon as he comes aboard.

When the ship is going to leave port, it is usual to hoist 'P' or Blue Peter, twenty four hours before sailing. Some ports make this a rule, and some make the minimum time twelve hours before sailing.

If a ship leaves under the guidance of a pilot, it will hoist 'H' or alternatively, in Britain the Trinity House Flag.

These are just a few examples of the fascinating use of flags at sea.



Below are substitute flags which are used on special occasions.

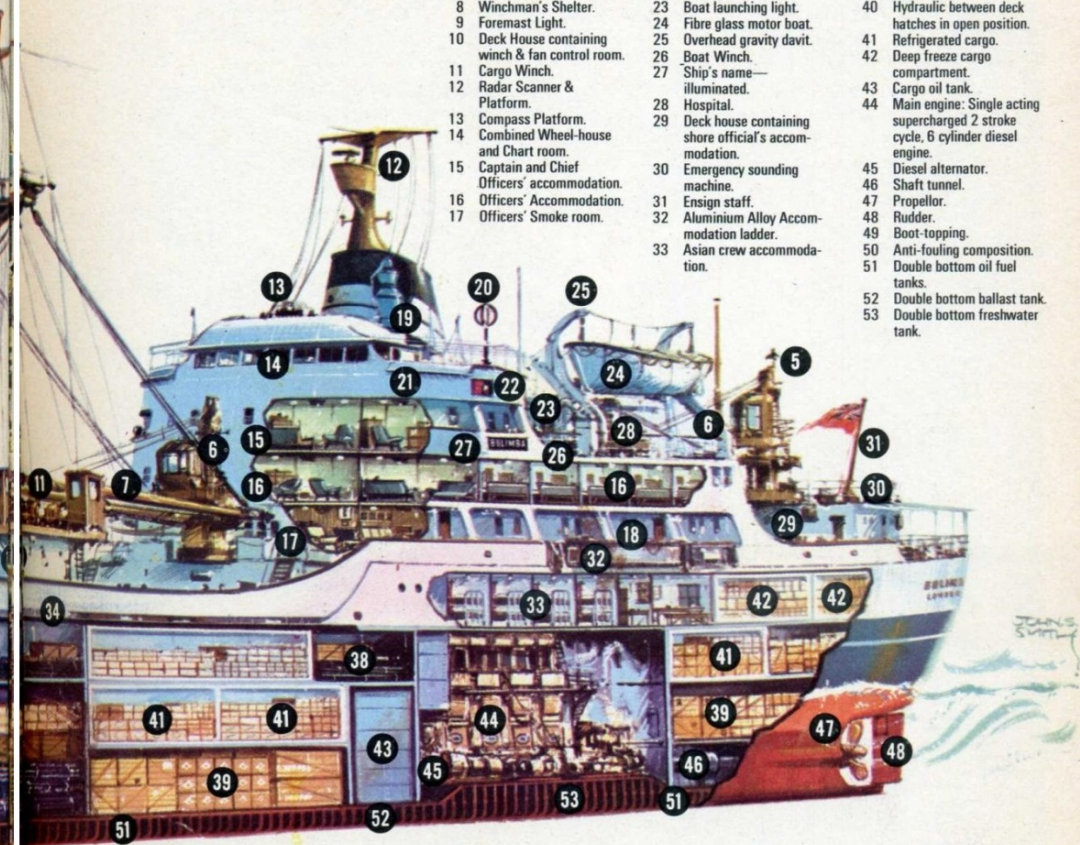
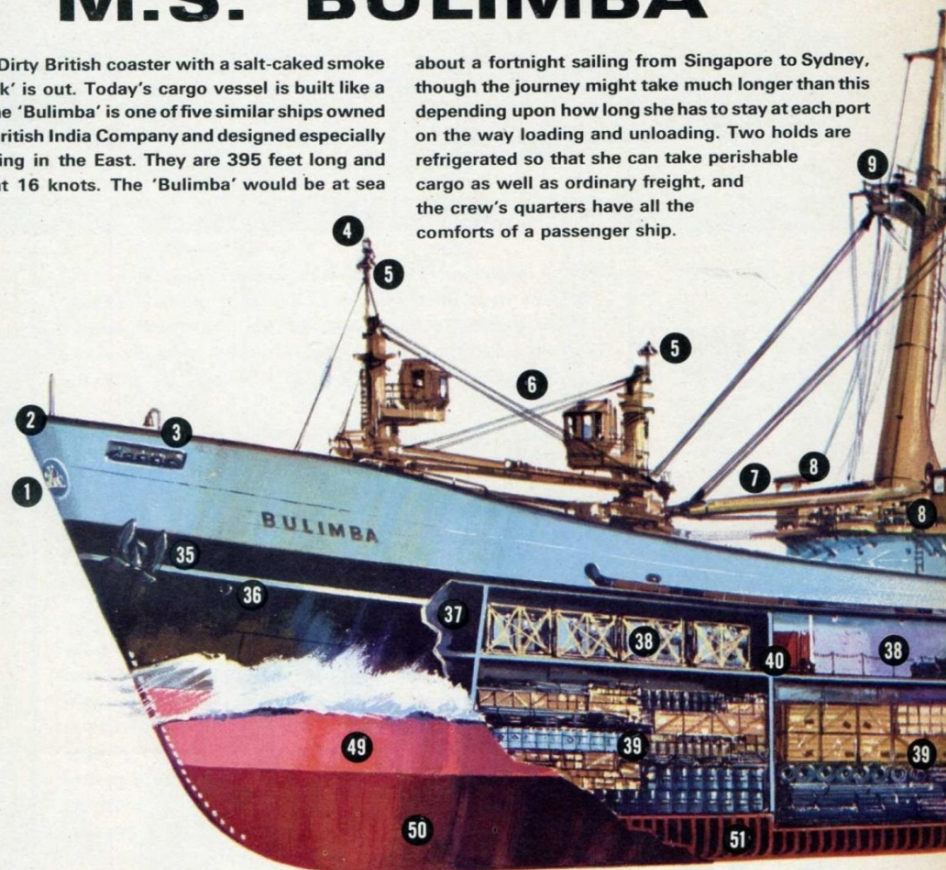


LOOKING INTO THINGS

A MODERN BRITISH CARGO SHIP M.S. 'BULIMBA'

The Dirty British coaster with a salt-caked smoke stack' is out. Today's cargo vessel is built like a liner. The 'Bulimba' is one of five similar ships owned by the British India Company and designed especially for trading in the East. They are 395 feet long and cruise at 16 knots. The 'Bulimba' would be at sea

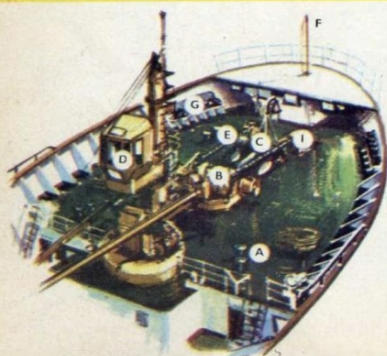
about a fortnight sailing from Singapore to Sydney, though the journey might take much longer than this depending upon how long she has to stay at each port on the way loading and unloading. Two holds are refrigerated so that she can take perishable cargo as well as ordinary freight, and the crew's quarters have all the comforts of a passenger ship.



- 1 Bowcrest.
- 2 Jack Staff.
- 3 Bell.
- 4 Anchor Light.
- 5 Floodlight.
- 6 "Asea" Cranes Stowed For Sea.
- 7 10 Ton Derricks.
- 8 Winchman's Shelter.
- 9 Foremast Light.
- 10 Deck House containing winch & fan control room.
- 11 Cargo Winch.
- 12 Radar Scanner & Platform.
- 13 Compass Platform.
- 14 Combined Wheel-house and Chart room.
- 15 Captain and Chief Officers' accommodation.
- 16 Officers' Accommodation.
- 17 Officers' Smoke room.
- 18 Petty Officer's accommodation.
- 19 Exhaust gas boiler in funnel.
- 20 Radio direction finder aerial.
- 21 Wind deflector Bulwark.
- 22 Sidelight.
- 23 Boat launching light.
- 24 Fibre glass motor boat.
- 25 Overhead gravity davit.
- 26 Boat Winch.
- 27 Ship's name—illuminated.
- 28 Hospital.
- 29 Deck house containing shore official's accommodation.
- 30 Emergency sounding machine.
- 31 Ensign staff.
- 32 Aluminium Alloy Accommodation ladder.
- 33 Asian crew accommodation.
- 34 Bulwark slot.
- 35 Bower anchor.
- 36 River mooring pipe.
- 37 Collision bulkhead.
- 38 General cargo stowed in Tween deck.
- 39 General cargo stowed in hold.
- 40 Hydraulic between deck hatches in open position.
- 41 Refrigerated cargo.
- 42 Deep freeze cargo compartment.
- 43 Cargo oil tank.
- 44 Main engine: Single acting supercharged 2 stroke cycle, 6 cylinder diesel engine.
- 45 Diesel alternator.
- 46 Shaft tunnel.
- 47 Propeller.
- 48 Rudder.
- 49 Boot-topping.
- 50 Anti-fouling composition.
- 51 Double bottom oil fuel tanks.
- 52 Double bottom ballast tank.
- 53 Double bottom freshwater tank.

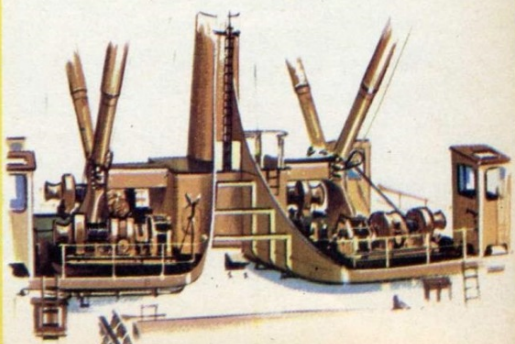
The Forecastle

Key to forecastle on the left: A Bollards. B Windlass. C Spare Anchor. D Electric Crane. E Anchor Chains. F Jack Staff. G Fairleads. H Warping Ends. I Hawser Pipes.

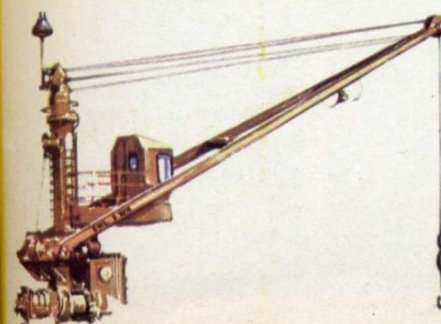


Cargo Winches

Right: Electric cargo winches with attached topping units operate four 10-ton derricks covering the after part of No. 2 and forward part of No. 3 holds. On each of the last two ships one 25-ton derrick has been fitted.



Deck Crane



Left: These ships have five 3-ton electric deck cranes of such large radius that No. 1 and No. 4 holds are completely covered and also forward part No. 2 and after part No. 3 holds are covered.

Right: Self-closing hatch covers secure the all-weather deck—single pull Macgregor hatch covers are electrically operated by push-button control. Tween deck hatch covers are hydraulically operated by remote control from the weather-deck.

Hatch Covers



The 3 ORBITS of COLONEL GLENN

1951, during the Korean war, on the Yalu front.



Enemy aircraft bearing at 11 o'clock. I am attacking.

The battle was short.



Got him!

The Mig was shot down over the American lines.



Well done, Lieutenant! That's your third victory isn't it?

Shortly afterwards at the American base...



Fantastic, old chap...

Great, John!

Who is that fellow over there?

A certain Colonel Glenn—a real air ace!

Identity Card:

John Glenn born 1921.

Tried unsuccessfully to enrol in the Airforce. Admitted to the Marines and became an officer in the Fleet Air Arm. 59 combat missions during the war in the Pacific, 63 in Korea, decorated 24 times. Test pilot responsible for the scrutinization of planes for the Fleet Air Arm. Married with two children: David aged 14 and Lynn aged 13.

In 1959 Colonel Glenn was selected to take part in the mercury project. This was the first series of experiments being carried out in the United States, with a view to landing on the moon.



Gentlemen, I have the pleasure of informing you that you are here to make the first cosmic flights. I am sure that I don't have to tell you that it isn't reckless dare-devils that we want, but seasoned, well-trained men.

... The training started pleasantly enough.

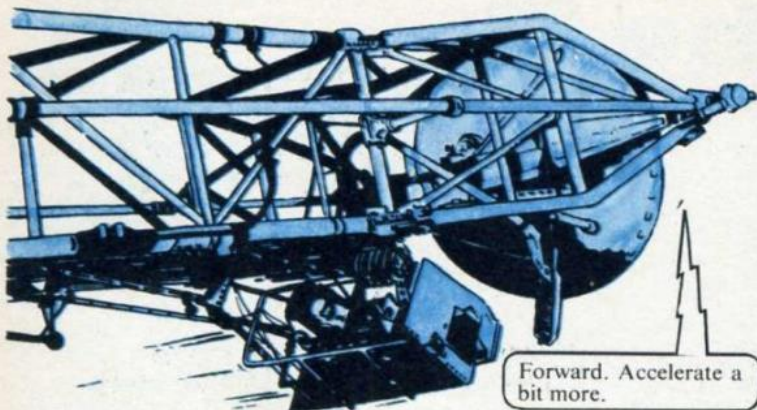


It's great this morning!

And was then gradually stepped up.

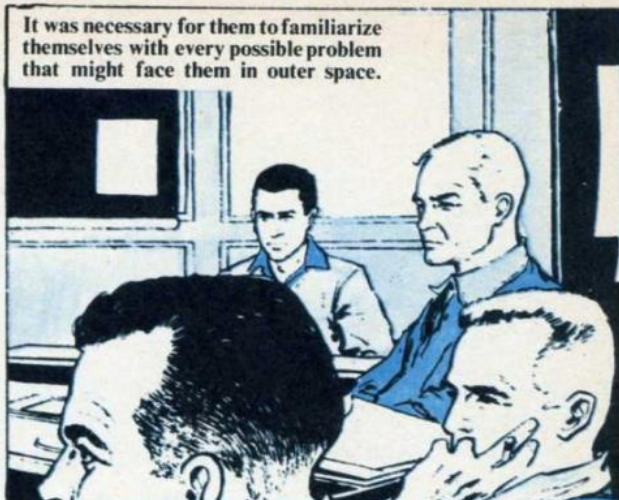


Special apparatus had been made to get the future astronauts in condition.



Forward. Accelerate a bit more.

It was necessary for them to familiarize themselves with every possible problem that might face them in outer space.



The training was completed with a final check-up...

How am I doing, Doctor?

You're in fine form, Colonel Glenn. And I congratulate you on having been chosen to carry out the first American orbital flight. The whole country will be behind you and with you.



And on Tuesday 20th February 1962 at 2.30 in the morning, at the space building at Cape Canaveral...

Colonel Glenn, it's time...



You think this time all will go well? This will make half a dozen times that departure has been delayed.

Until now the count-down has gone without a hitch.

It's a great day for America and you, Colonel.

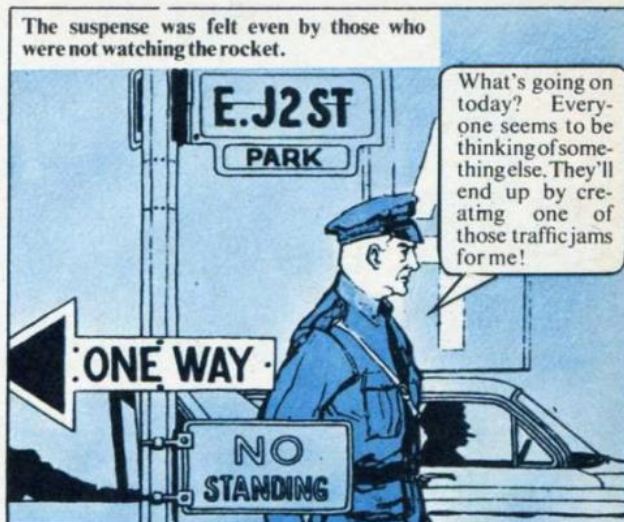


More than 50,000 interested people had gathered at Cape Canaveral, and had spent the night waiting.

Phew! The suspense of all this is terrific!



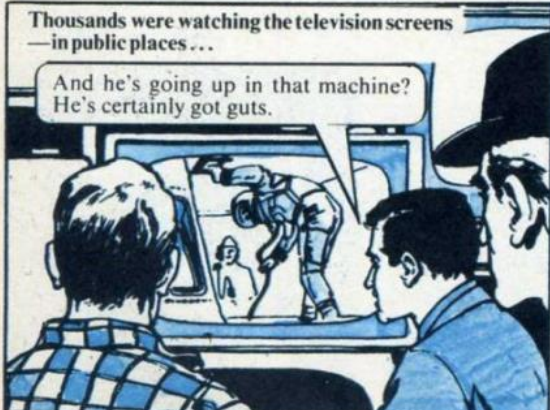
The suspense was felt even by those who were not watching the rocket.



What's going on today? Everyone seems to be thinking of something else. They'll end up by creating one of those traffic jams for me!

Thousands were watching the television screens—in public places...

And he's going up in that machine? He's certainly got guts.

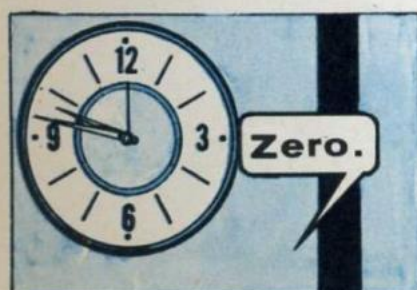
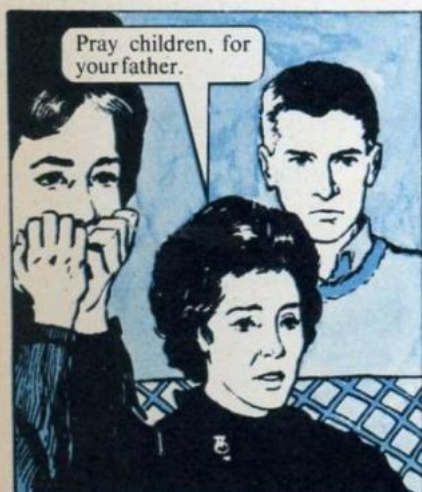


... and in their homes.

Look, Mother, Dad's climbing into his capsule!



The suspense continued to mount...

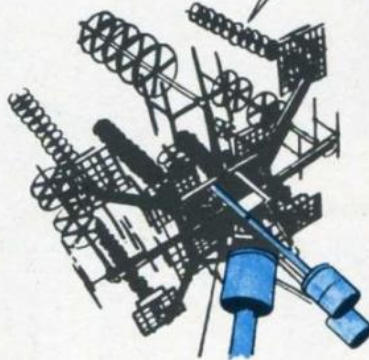


Immediately the giant apparatus geared to follow the flight of the capsule Friendship 7 (that's what Glenn's vehicle was called), went into action. Tracking stations were on the alert in the Bahamas, in Bermuda, on a boat in the middle of the Atlantic, in the Canaries, Nigeria, Zanzibar, on a boat in the middle of the Indian Ocean, at both ends of Australia, at Canton Island, at Hawaii, in California, Mexico, New Mexico, Texas and Florida.



How do you feel?

Couldn't be better. A splendid trip.



I can see Florida. It's the second time we've passed it.



All over America, life had, so to speak, come to a standstill.

Keep it up, chum.



First orbit completed in 88 minutes.

The second and third orbits went off without incident but at 14.18 hours.

I can see the coast. I'm preparing to land.



Attention, Colonel. We are afraid that the heat protective shield might detach itself during your re-entry into the atmosphere.



But everything went off quite normally.



On board the destroyer, Noa.

Here it is Commander. I can see the parachute.



And shortly afterwards . . .

Colonel Glenn, who has completed three orbits of the earth, landed in the sea safe and sound, and was picked up at 15.01 hours.



Some days later, the reception took place in New York for the first American astronaut, including the traditional procession of the "scraps of paper". After the parade 3,474 tons of paper were gathered from the street. The previous record was held by General MacArthur: 3,249 tons. For Linbergh, after his Atlantic crossing in 1927, the figure was 1,750 tons.



